CARPENTER'S NEW GEOGRAPHICAL READER

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80°
70°
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Caribbean Sea
CENTRAL AMERICA
Colon
Panama Canal
Isthmus of Panama
Gulf of Panama
PANAMA
Gulf of Darien
Barranquilla
Cartagena
Pt. Gallinas
CURAÇAO (Dutch)
La Guaira
Caracas
Barcelona
Port of Spain
TRINIDAD (British)
Maracaibo
L. Maracaibo
Valencia
Barquisimeto
Delta of the Orinoco R.
Merida
Cucuta
Orinoco R.
Ciudad Bolivar
VENEZUELA
Georgetown
Paramaribo
Cayenne
BRITISH GUIANA
DUTCH
FRENCH
Medellin
Bucaramanga
Magdalena R.
Cauca R.
Vol. Tolima
Bogota
Cali
COLOMBIA
Popayan
Meta R.
Sa. Parima
Sierra Pacaraima
Casiquiare R.
Tumac Humac Mts.
Mouths of the Amazon R.
Equator
Quito
Vol. Cotopaxi
Vol. Chimborazo
Napo R.
Guayaquil
Gulf of Guayaquil
ECUADOR
Cuenca
Yapura R.
Rio Negro
MARAJO I.
Para
Maranhao
Manaos
Santarem
Iquitos
Amazon River
Tapajoz R.
Xingu R.
Tocantins R.
Ceara
Pt. Parina
Paita
Tabatinga
Maranon R.
Yavari R.
Juruá R.
Purus R.
Madeira R.
Parnahiba R.
C. St. Roque
Parahiba
Pernambuco
Maceio
Falls of the Madeira
Mt. Huascaran
Ucayali R.
Acre R.
Teffe R.
BRAZIL
Lima
Callao
PERU
Cuzco
Guapore R.
Mamore R.
Matto Grosso
Cuyaba
Araguay R.
Bahia
L. Titicaca
Vol. Misti
Arequipa
Mollendo
Trinidad
Mt. Sorata
La Paz
Mt. Illimani
Cochabamba
Oruro
Sucre
Plateau
Santa Cruz
BOLIVIA
Plateau of Matto Grosso
Goyaz
São Francisco R.
Serra do Espinhaco
Diamantina
Serra dos Aymores
PACIFIC OCEAN
ATLANTIC OCEAN

Political
SOUTH AMERICA
Scale of Statute Miles
0 100 200 300 400 500 600 700 800 900 1000
600 MILES TO ONE INCH
Principal Railroads
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Antofagasta
Jujuy
Salta
Asuncion
Villa Rica
São Paulo
Santos
Rio de Janeiro
Copiapo
Tucuman
Corrientes
Blumenau
La Serena
Cordoba
Santa Fe
Parana
Pelotas
Porto Alegre
Mt. Aconcagua
Valparaiso
Santiago
Mendoza
Rosario
Buenos Aires
La Plata
Rio Grande do Sul
JUAN FERNANDEZ IS. (Chile)
Talca
Chillan
Concepcion
Montevideo
Plata R.
Bahia Blanca
Valdivia
San Matias Gulf
CHILOE I.
CHONOS ARCHIPELAGO
St. George Bay
C. Blanco
WELLINGTON I.
Strait of Magellan
FALKLAND IS. (British)
Punta Arenas
TIERRA DEL FUEGO
SOUTH GEORGIA I. (British)
Cape Horn
THE MATTHEWS-NORTHRUP WORKS, BUFFALO, N. Y.
100° 90° 80° 70° Longitude 60° West from 50° Greenwich 40° 30° 20°
30° 40° 50°

Llamas are the only beasts of burden native to South America. They are still used in the Andes.

CARPENTER'S NEW GEOGRAPHICAL READER

SOUTH AMERICA

BY

FRANK G. CARPENTER, LITT.D.

AUTHOR OF

"AROUND THE WORLD WITH THE CHILDREN" AND

"READERS ON COMMERCE AND INDUSTRY"

AMERICAN BOOK COMPANY

NEW YORK CINCINNATI CHICAGO

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BOOKS BY

FRANK G. CARPENTER

"Reading Carpenter is Seeing the World"

Introduction to Geography

AROUND THE WORLD WITH THE CHILDREN

Geographical Readers

NORTH AMERICA
SOUTH AMERICA
EUROPE
ASIA
AFRICA
AUSTRALIA AND ISLANDS OF THE SEA

Readers on Commerce and Industry

HOW THE WORLD IS FED
HOW THE WORLD IS CLOTHED
HOW THE WORLD IS HOUSED

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SHB 10 March 1911

PREFACE

This book is a revised edition of Carpenter's Geographical Reader, "South America," which for many years has been widely used in our schools. It is more than a revision, however, for it is a new work based upon up-to-date information gathered by the author during a recent tour of more than twenty-five thousand miles made by him in the countries described.

During this tour Mr. Carpenter has kept the children always in mind, and his story of their travels will, it is believed, bring them into a close personal relation with their brothers and sisters of South America. It will give them also a live working knowledge of the geography, resources, and people of each of the republics, and of the social, industrial, and commercial relations which each holds to the United States.

The plan is the same as that adopted in all the books of this series. It consists of imaginary travels made by the children with the author in the countries described. In this volume the children start out on a voyage from New York to the Isthmus of Panama, and from there move about leisurely from one South American country to another, making their observations and studies along the lines above mentioned. It is the children who do the traveling, and the book is the story of what they see and learn.

Here and there throughout the story the author has inserted questions which suggest interesting research work for the children. These will, it is believed, add greatly to

the value of the book. In connection with this feature, tables and diagrams of statistical information will be found at the back, and maps have been freely introduced throughout the text. The pictures also will furnish material for study. Most of them are new, and many are from photographs taken by the author to illustrate this book.

In order to bring out the world relations of South America, frequent comparisons with the United States and other countries and people of the world should be made by the children. For this purpose, reference to the other volumes of the Carpenter Readers will prove valuable. For example, in connection with the diamond mines of Brazil, the interest and information of the child will be increased by comparing them with the diamond mines of Kimberley in Carpenter's "Africa," by reading of the diamond industry in Carpenter's "How the World is Clothed," and by a visit to the diamond cutting establishments of Amsterdam, in Carpenter's "Europe." In the same way, the world study of cotton, coffee, rubber, wool, meat, and almost every other product of South America may be developed.

The two series of books referred to in this connection comprise Carpenter's Geographical Readers on North America, South America, Europe, Asia, Africa, and Australia, and his Industrial Readers entitled: "How the World is Clothed," "How the World is Fed," and "How the World is Housed."

CONTENTS

		PAGE
I.	Introduction	13
II.	From New York to Panama	21
III.	Panama and the Pacific Ocean	27
IV.	We Steam through the Canal	31
V.	The Republic of Colombia	40
VI.	Up the Magdalena to Bogota	45
VII.	Emeralds and Platinum	51
VIII.	A Land of the Equator	56
IX.	Climbing the Andes to Quito	66
X.	In the Great South American Desert	76
XI.	In Lima, the Capital of Peru	85
XII.	Up the Andes	92
XIII.	On the Roof of South America	98
XIV.	Steamboating above the Clouds	111
XV.	Travels in Bolivia	117
XVI.	The Mineral Wealth of the Andes	130
XVII.	Chile — The Nitrate Desert and the Guano Islands	135
XVIII.	Along the Coast to Valparaiso	144
XIX.	Across South America by Rail	151
XX.	Santiago, the Capital of Chile	159
XXI.	A Visit to a Chilean Farm	165
XXII.	Southern Chile and the Araucanians	172
XXIII.	In the Coal Mines of Chile	175
XXIV.	In and about the Strait of Magellan	181

		PAGE
XXV.	At the End of the Continent	188
XXVI.	Argentina — Patagonia	196
XXVII.	In Argentina — Life on the Pampas	203
XXVIII.	The Bread Lands of South America	213
XXIX.	Buenos Aires	223
XXX.	Uruguay — Montevideo	232
XXXI.	Up the Rio de la Plata System	241
XXXII.	The Gran Chaco	247
XXXIII.	Paraguay	254
XXXIV.	A Trip into the Interior of Paraguay	264
XXXV.	Maté, or Paraguay Tea	271
XXXVI.	Brazil	275
XXXVII.	The Wilds of Matto Grosso	280
XXXVIII.	The Niagara of South America — Southern Brazil	285
XXXIX.	Santos and São Paulo	289
XL.	In the Land of Coffee	293
XLI.	A City of Snakes — Some Wild Animals of Brazil	301
XLII.	Rio de Janeiro	305
XLIII.	More about Rio	311
XLIV.	Bahia	319
XLV.	The Mines of Brazil — Diamonds, Iron, and Gold	325
XLVI.	Along the Coast of Brazil	327
XLVII.	The King of Rivers	333
XLVIII.	Pará, the Metropolis of the Amazon	337
XLIX.	In the Land of Rubber	343
L.	A Trip on the Amazon River	351
LI.	Some Wild Indians of Brazil	357

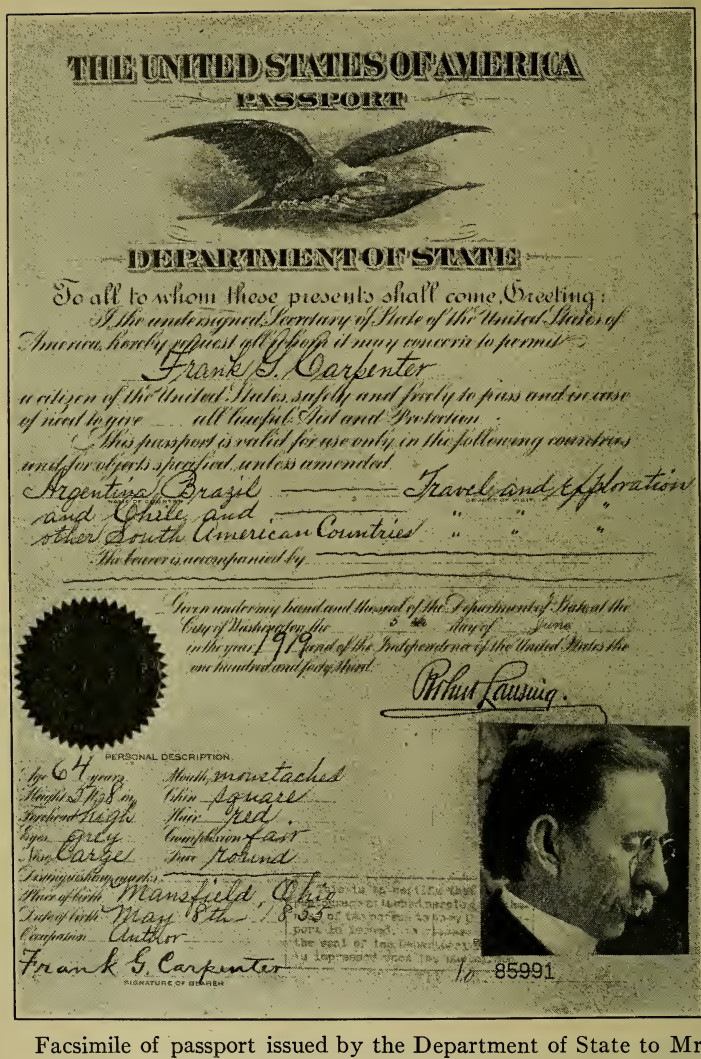
PAGE

LII. The Orinoco and the Llanos 365
LIII. Venezuela and Its Capital 370
LIV. La Guaira and Caracas 373
LV. The Guianas 379

Tables 390
Index 397

LIST OF MAPS

South America (colored map) 2, 7
South America (black relief map) 18
New York to Panama (route map) 21
Canal Zone (black relief map) 29
Colombia (route map) 40
Ecuador (route map) 57
Peru (route map) 77
Bolivia (route map) 117
Chile (route map) 137
Argentina (route map) 195
Uruguay (route map) 232
Paraguay (route map) 255
Brazil (route map) 279
Venezuela (route map) 371
The Guianas (route map) 381


THE UNITED STATES OF AMERICA

PASSPORT

DEPARTMENT OF STATE

To all to whom these presents shall come, Greeting:

I, the undersigned, Secretary of State of the United States of America, hereby request all those it may concern to permit

Frank G. Carpenter

a citizen of the United States, safely and freely to pass and in case of need to give all lawful Aid and Protection.

This passport is valid for use only in the following countries and for objects specified, unless amended:

Argentina, Brazil and Chile and other South American Countries — Travel and Exploration " " "

The bearer is accompanied by

Given under my hand and the seal of the Department of State, at the City of Washington, the 5th day of June in the year 1911 and of the Independence of the United States the one hundred and forty-third.

Philander Knox.

PERSONAL DESCRIPTION.

Age 44 years
Height 5 ft 8 in
Forehead High
Eyes Grey
Nose Large
Mouth, moustached
Chin Square
Hair Red
Complexion Fair
Face Round

Countries visited

Place of birth Mansfield, Ohio
Date of birth May 8th, 1865
Occupation Author

Frank G. Carpenter
SIGNATURE OF BEARER

No. 85991

Facsimile of passport issued by the Department of State to Mr. Carpenter. This passport admitted the author to South American countries to gather the material for this book.

SOUTH AMERICA

I. INTRODUCTION

WE shall start on our journey to South America from the city of Washington. We have come by train from our homes to the national capital, have called upon the President at the White House, and after taking the oath of allegiance to the United States have arranged with the Secretary of State for our passports. Each passport bears a photograph of its owner, his signature, and a description showing just how he looks. It tells how tall he is, the color of his eyes, hair, and face, describes his nose, chin, and mouth, and tells just how old he was when the passport was issued. It is signed by the Secretary of State, and it requests all people to permit the bearer to pass safely and freely and to give him all lawful aid and protection. We shall need these passports to prove we are Americans, so that we can claim the rights our citizens have all over the world.

Leaving the State Department, we walk through the beautiful park at the south to the marble palace of the Pan American Union, which has to do with the sister republics of North and South America. Its aim is to increase the friendly relations between the peoples of the two continents and to further everything connected with their commerce and trade. Each of the republics has its own representative

at Washington, and here we can learn many things we ought to know before starting out.

Now we have entered the building, have passed through the great marble court roofed with glass, where palm trees and other tropical plants are growing, and are standing in the rear of the hall, on the floor of which is one of the

Building of the Pan American Union, a society organized to promote acquaintance and friendly relations between the United States and the Latin Republics of America.

largest relief maps in the world. This map represents South America as it might look to one if he stood upon the moon and had a telescope so powerful that he could see the whole continent at one glance. The map would more than cover the floor of the largest schoolroom, and it shows the mountains and plains and the rivers and lakes of our great sister continent.

But first let us see just where South America lies on the earth. We go to the globe and run our fingers around it along the equator. We see that the most of South America lies south of that line and that much of it is in the southern hemisphere. In that respect it is like Africa, although it extends much farther south than either Australia or Africa. It comes nearest the South Pole of all the inhabited continents.

Dividing the globe again into halves, and this time at right angles with the equator, we observe that South America lies in the western hemisphere. It is a part of the new world that Columbus discovered when he started westward from Europe looking for a shorter way to India. He landed on the West India Islands in 1492, and it was not until six years later that he coasted the mainland of South America near the mouth of the Orinoco River. He traveled along the northern shores of South America again in 1502, and before that time Pinzon had entered the mouth of the Amazon, and Americus Vespucius had gone along the east coast of South America as far as the mouth of the Rio de la Plata. In the meantime, John Cabot and others had discovered parts of North America.

As we look at North and South America on the globe we see that South America lies far to the east of North America. Indeed, their positions are such that if we should take an airplane here at Washington and fly straight southward we would strike South America a little east of the Panama Canal, and if we flew on south, passing through Colombia, Ecuador, and Peru, we would soon find ourselves out over the Pacific Ocean with a large part of the continent stretching away to the eastward. Much of the Pacific coast of South America is farther east than Philadelphia or New York.

By looking at the globe we can compare the continents and get some idea of the enormous country we are about to explore. South America contains about one eighth of all the land on earth. If we should divide all the land on the globe into eighty-acre farms, ten acres in each farm would belong to South America. The continent is smaller than Asia, Africa, or North America, but it is larger than all Europe with the main body of the United States added thereto.

Moreover, it has no great deserts like Africa or Asia, and no vast wastes such as the northern part of North America, which is locked in cold and darkness for most of the year. Except on the highest peaks of the Andes, South America has no region of perpetual ice, and even at the far south about the Strait of Magellan the land is so tempered by the winds from the ocean that the sheep feed out of doors all the year round. It is true that three fourths of the continent is in the torrid zone, but much of the land near the equator is so high above the level of the sea that the climate is as temperate as in many parts of our country.

The fact that most of the continent lies south of the equator makes the seasons there directly the opposite of ours. It is now winter here in Washington, but as soon as we go south of the equator we shall be in the summer, and if we continue our journey until fall it will be while our friends at home are having their spring. We shall see also that at high noon our shadows fall to the south. Can you tell why?

Leaving the globe, we stroll about the relief map as it lies on the floor, observing how like South America is to our own continent of North America in shape and surface. Each continent is roughly triangular. Each has a long

system of highlands running along the Pacific coast and another range of lower highlands near the east coast, with a wide plain or central lowland between them. The Andes corresponds to our great western highlands, and the highlands of Guiana (gē-ä′nȧ) and eastern Brazil are somewhat like our Appalachian Mountains. The eastern highlands of North America are broken by a great river, the St. Lawrence, and those of South America by another great river, the Amazon. The Amazon basin compares somewhat with that of the Great Lakes in situation. Both slope to the east and break through highlands. The Rio de la Plata (rē′ō dā lä plä′tä) basin is not unlike the Mississippi valley.

The natural features of South America are grander than those of North America. The Andes are higher than the Rockies and they have a score of volcanoes, each of which is more than a mile higher than the top of Pikes Peak. Mount Aconcagua (ä-kön-kä′gwä) is more than a half mile higher than Mount McKinley, the highest point on the North American continent.

The earth has no river system that compares in size with the Amazon, whose navigable tributaries, if joined together, would reach around the globe. On the Rio de la Plata we can go north by steamers for a greater distance than from the Gulf of Mexico to Hudson Bay, and the Amazon, Orinoco, and La Plata systems, taken together, drain more country than the whole of the United States, including Alaska. Indeed, most of South America is a well-watered country, and much of it has the climate and soil which will some day make it the home of a large part of the world's population.

During our stay at the Pan American Union we learn much about the resources of South America and how closely its people are connected with us in industry and

South America. Relief and drainage.

trade. Many of our farmers use the nitrates from the South American desert to fertilize their crops. Our finest rubber comes from the wild trees of the Amazon basin, and almost all the coffee we drink is grown in Brazil. The most of our chocolate comes from the cacao trees of Brazil, Venezuela, Colombia, and Ecuador. Some of us may have a product of Argentina under our feet, for it is from that region that come many of the hides from which our leather is made. We import wool and meat from the Rio de la Plata basin. We get some of our tin from Bolivia, and considerable copper from Peru and Chile. We have diamonds from Brazil and emeralds from Colombia. Indeed, there is hardly a state of South America that does not supply us with materials of one kind or another, and we shall learn that the South Americans are using more and more of the things we raise and the manufactures we make for export to other nations.

But what kind of people are these among whom we are going to travel? We can see something of them in the photographs of the various countries and cities in the library of the Pan American Union. Most of the South Americans are of the white race and they dress much as we do. There are also some negroes in Brazil, and many Indians in their different stages of savagery and civilization scattered over the continent. The Indians are the descendants of those who inhabited South America at the time Columbus first set foot on the northern shores of the continent. The negroes were brought from Africa as slaves, but they were afterwards freed and now have the same rights as the whites. The white population is composed of the descendants of the Spaniards and Portuguese who conquered the Indians and of those who intermarried with the Indians, forming a new race, as it were.

During our travels we shall find that the South Americans have a civilization and customs similar to ours. They have farms and factories and all sorts of industries. They have many magnificent cities with the latest of modern improvements, including schools much like our own. They are building railways and beginning to develop their enormous resources. Most of the republics have governments like ours, and nearly all of them are growing in population, industry, and wealth. But we shall see all this better as we go on with our travels.

1. Why do we need passports? Why must we take the oath of allegiance? Why are our photographs and signatures needed? Make out a passport for yourself. (See illustration.)

2. What is the Pan American Union?

3. Locate South America on the globe — as to oceans — as to continents. Describe its surface from the relief map. Compare with North America. What highlands in South America remind us of the Rockies? Of the Appalachians? What great river have we that compares with the Amazon?

4. How large is South America? Compare it in size with North America; Europe; Asia; the United States. How many countries has it? Which is the largest? The smallest? Which ones are north of the equator? South? Compare each country with an American state. Compare the population of South America with that of the United States. (See Tables III and V.)

5. What climates has South America? In what zone does most of it lie? When we are having winter at home what is the season in South America south of the equator? Why? Why is it not cold in the southernmost part of the continent?

6. In what latitude do you live? Take an airplane trip directly south and find if you could reach South America. If so, what part of the continent?

7. What do we buy of South America? Mention some South American products we use almost every day.

8. What three races of people live in South America? What race was there when Columbus first landed? From where did the whites and negroes come?

II. FROM NEW YORK TO PANAMA

WE have left Washington, have come to New York, and are now on a great white steamer bound for the Isthmus of Panama. The ship has already finished loading its cargo, and we make our way in and out among

the men who are wheeling on board the bags containing the South American mails.

A moment later the bugle blows to notify all who are not going with us to leave. There are farewell kisses and

A steel steamship of medium size, which carries passengers and freight between New York and Panama.

hurried good-bys. The engines throb, and as we wave our handkerchiefs to our friends on the wharf, our boat moves slowly out into the East River and past the statue of Liberty, through the harbor of New York. Within a short time the city has passed out of view, and as evening falls we stand at the stern of the steamer and watch the lights of Sandy Hook fade away into the darkness, realizing that we shall not see our native land for many months to come.

It is about two thousand miles from New York to Cristobal (krĭs-tō-bäl′) at the mouth of the Panama Canal, but our ship does not go so fast as the big steamers which cross the Atlantic to Europe, and it will take almost six days for our voyage. It is now winter. There was snow on the streets of New York when we left, and we have on our heaviest clothing. The first day out is cold and bracing, and we spend the time in learning our steamer. It is a steel vessel, five hundred feet long and sixty feet wide, and it has a speed of about fifteen knots an hour.

Our cabins are on the top deck, and we can look out of our windows when we wake in the morning and see the blue ocean rising and falling under our eyes. There are many whitecaps on the waves and the billows seem to be chasing one another over the sea. Each cabin is about the size of the smallest hall bedroom. It has two berths, one over the other, on the wall at the back, and opposite them are two windows which look out on the sea. We have room under the berths for our low steamer trunks, and at the end opposite the door is a washstand set into the wall with pockets for our combs, brushes, and other toilet articles. We have hot and cold water at all hours of the day. The cabin has an electric light, and also an electric fan which we can set whizzing by pressing a button.

We shall need that fan for it will be warm when we approach the equator.

Our ship is a United States vessel and flies the American flag. The sailors are from different parts of New England and our captain is a Yankee from Maine. At high noon every day he makes an observation, telling by the sun just where we are, and a little later we all rush to the cabin to learn how many miles we have gone in the past twenty-four hours.

Our first course is almost straight south. We are soon opposite Atlantic City, and from there we go on, passing Cape May, Cape Charles, and Cape Henry, but out of sight of them. It is on the second day that we reach Cape Hatteras and start across the Gulf Stream, that mighty river in the Atlantic which is three thousand times as great as the Mississippi in volume. There are patches of gulf weed floating about in it. Some of them look like green sponges upon the blue water and some like shawls of green lacework spread over the sea.

The air has now grown warm and moist. We have a sailor dip up some of the water and find it warmer than that in which we have been sailing, and when we take our baths in the morning they are as warm as our swimming pools in midsummer at home. We travel more than a hundred miles in crossing the Gulf Stream, observing that the air is cooler as we pass out of it on the edge of the Caribbean Sea.

But why do we not keep in the stream and be warm all the way? You will easily see when you remember how hard it is to row a boat against a strong current. The Gulf Stream flows north at the rate of three miles an hour, and we are going as fast as we can to the south. If we should keep in the Stream, we should have to steam against

this three-mile current and would lose at least three miles an hour.

But what is that away off to our right? It seems little more than a blue speck in the distance. That is San Salvador (sän säl-vȧ-dōr′), one of the most famous islands of the world. It is the first land that Columbus saw when he discovered America. When he first stood upon San Salvador he thought it an island off the east coast of Asia and did not realize that he had found a new world. We can see the lighthouse on the island plainly as we go by. There are palm trees near it, and if we could stop we should find the vegetation much like that of Florida. San Salvador is one of the Bahama Islands. It produces fruits, grains, and roots in abundance, and it is as rich now as when Columbus came there and saw the first Indians ever met by white men.

A little farther south we pass Bird Rock, another of the Bahamas, and still farther south the coast of eastern Cuba comes into view, with the purple mountains of Haiti in plain sight on the opposite side of the ship. We sail between these two islands for hours. We pass our naval station of Guantanamo (gwän-tän′ä-mō), near Santiago (sän-tē̇-ä′gō) in Cuba, where our war vessels guard this passage on the way to the canal, and then go out over the blue waters of the Caribbean.

The sea is now like glass. The sun is quite hot at noon, but during the rest of the day the air is soft, warm, and pleasant. It is much like a June day in Ohio or Virginia. We put on our thin linen clothes and enjoy the tropical seas. After leaving Cuba we sail for two days with no land in sight. There are but few ships, and the only moving things upon the water are the white gulls which hover about us, and the schools of silvery flying-fish which

dart from wave to wave, one now and then jumping too high and lighting on our deck in its flight.

But listen, the captain is calling! He tells us that we are approaching the Isthmus of Panama, that wonderful strip of earth which ties North America and South America together. We rush to the prow of the ship and look toward the west. A thin line of hazy blue seems to be floating up out of the water at the horizon. Now the blue deepens. It rises in a range of low mountains, while little green islands seem to bob out of the sea in front of our steamer.

Now we are closer. That tall shaft at the right is the Toro lighthouse, and the buildings and docks at the left are those of Cristobal at the eastern entrance to the Panama Canal. Beside Cristobal is Colon (kō-lōn′), the old town on this side of the isthmus. We can see the coconut palm trees shading the houses. They extend down to the shore and their fan-like leaves, moving to and fro in the breeze, seem to be waving to us a welcome to Panama.

1. How do we go to South America? Describe our journey.

2. How far is it from New York to Panama? How long does it take us? Make a list of the places we pass on the way. Suppose we went from New York along the east coast of South America, how far would we travel to Rio de Janeiro? To Buenos Aires? To Panama via the Strait of Magellan?

3. Why does the captain take observations of the sun?

4. What is the Gulf Stream? How long does it take us to cross it at the rate of fifteen miles per hour?

5. Trace Columbus' journey on the map from Palos near Gibraltar to San Salvador.

6. Locate Cuba and Haiti on the map.

7. Where is Guantanamo? Why is it an important place on the route to Panama? Why do we need to guard the way into the Caribbean Sea? What great naval battle took place near Santiago? What brave deed was done by a naval officer in a narrow strait there?

III. PANAMA AND THE PACIFIC OCEAN

WE shall steam through the Isthmus of Panama within a very few hours. The first white man who crossed it took twenty-nine days, and his journey has made him famous as one of the world's great explorers. It was but a few years after South America was discovered. In his first voyage Columbus had touched only at the West Indies, and it was not until 1498 that he set foot on the mainland of the continent not far from the mouth of the Orinoco River. Within the next six years he had coasted the country from Mexico to Venezuela, and other explorers, including Americus Vespucius, for whom America was named, had gone along the east coast as far south as the mouth of the Rio de la Plata. In the meantime, John and Sebastian Cabot had visited the shores of New England, and a great land was known to lie at the north.

Everywhere along this vast stretch of coast the explorers were looking for a waterway through to India and Japan. They still supposed that America was a part of Asia and did not know that a new world was discovered. Expedition after expedition was sent out from Europe to find out more about the country, and among the most daring of the adventurers was a young Spaniard named Vasco Nuñez de Balboa, who came with a party to the Gulf of Darien, not far east of where we are now. Here he founded a settlement, married the daughter of an Indian chief, and went about trading for gold.

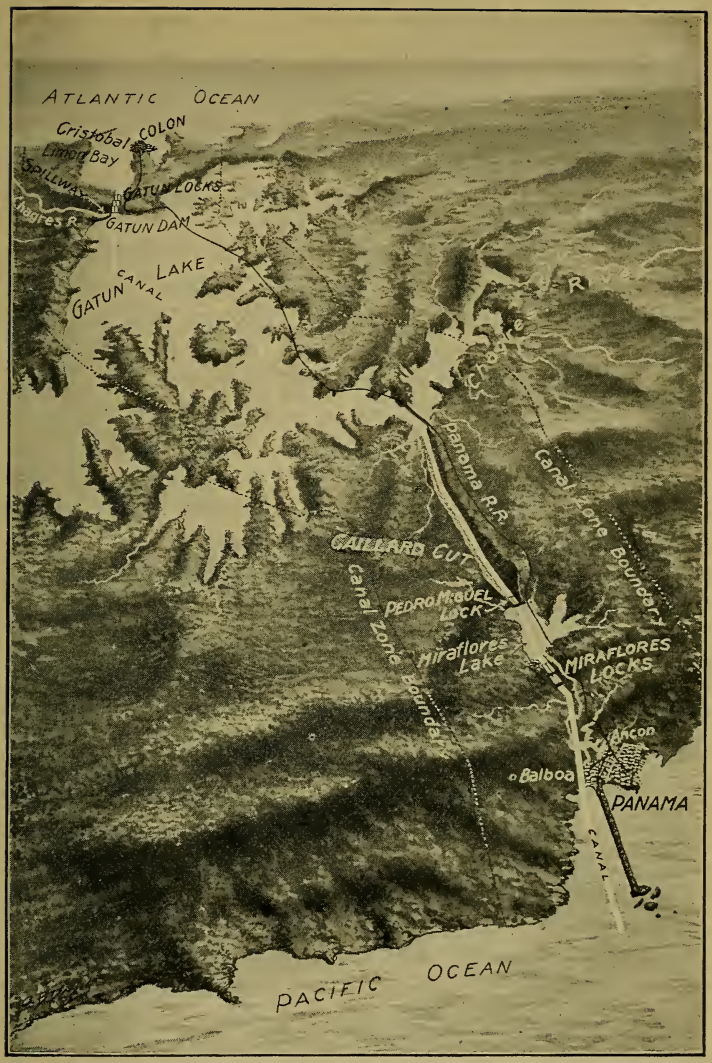
One day when he was weighing some gold that he was about to buy, one of the chiefs struck the scales with his fist, scattering the precious metal upon the ground, and said: "If this is what you prize so much that you are ready to leave your homes and risk your lives for it, I can

tell you of a land where gold is so common that the people use it instead of pottery for their bowls and cups."

The chief spoke of Peru, a country which was then rich in gold, and in which we shall travel by and by. His words excited Balboa. He questioned the Indians, and was told that over the mountains was a sea so great that no one had ever come to its end, and that the land of gold lay to the southward on the shores of that sea.

Balboa decided to find out if this story was true, and early in September, 1513, he started with about two hundred men and a small pack of bloodhounds to make his way over the mountains. He soon had a fight with the Indians, but they were frightened at the guns and dogs. He conquered them and persuaded them to act as his guides. He then cut his way through the thick forests to the top of the range, and there, on the twenty-fifth day of September, 1513, was able to look out over the great expanse of water which we call the Pacific Ocean. Four days later he had cut a path through the jungle down the south slope and with sword in hand had rushed into the water up to his waist, claiming the sea and all it contained for the king of Spain. This was seven years before Ferdinand Magellan had sailed from the Atlantic into the Pacific Ocean, through the strait named after him at the southern end of the continent.

The Isthmus of Panama is not large. The neck of an hour glass is not so narrow in comparison with the globes above and below it, as is this little strip of land with the continents of North America and South America which it joins. If the country were level, we could walk across its narrowest part in a day, and with an airplane we could fly over the mountains from ocean to ocean in less than an hour. Yes, the isthmus is narrow, but until we built the canal from



Relief Map of the Panama Canal.

one side to the other it formed a wall against the commerce of the world. All ships going from the Atlantic westward into the Pacific had to sail many thousands of miles out of their courses in traveling around South America, and there was no short cut from ocean to ocean. The necessity of a canal was seen shortly after Balboa discovered the Pacific, and he suggested that one might be made through the mountains at Darien some distance east of where the Panama Canal now is. Thirty-eight years later King Philip II of Spain was urged to dig such a canal, and it is now several hundred years since Antonio Galvo, a Portuguese, wrote a book showing that canals might be made through Nicaragua, or Panama, or through the Isthmus of Darien. Other plans were made from time to time, but it was not until 1879, ten years after the Suez Canal was completed, that any real work was begun.

At that time Ferdinand de Lesseps, the French engineer who built the Suez Canal, made surveys of the Isthmus of Panama, and a great company was formed to cut through the land from one side to the other. Their plan was to make a sea level canal, and for a time it seemed as if one might be constructed within a few years. Many thousands of men were employed, shiploads of machinery were brought across the ocean from France, and vast sums of money were spent.

But the work soon proved to be greater than De Lesseps had thought, and the money was all gone before one third of the canal was dug. Later on another French company took hold and continued the digging for a few years. It also became discouraged and sold to the United States the rights which it had bought from Colombia to build the canal. That was in 1904, and within ten years from that time we had completed the canal that now connects the two oceans.

IV. WE STEAM THROUGH THE CANAL

OUR canal is not a great ditch cut through the isthmus at sea level from ocean to ocean. The waters of the Atlantic and Pacific oceans do not come together, and there is no salt water in the canal where it crosses the mountains. The canal is really a bridge from ocean to ocean formed by the fresh waters of the Chagres (chä′grĕs) River. It is a lock canal. The huge vessels steam in on salt water to the locks situated where the land rises on the Atlantic and Pacific sides of the isthmus. The fresh water is then let into the locks and lifts the vessels up step by step, until they are raised as high above the sea as the roof of an eight-story house. They are then able to steam into the wide and deep canal which has been cut across the isthmus. Then, by means of the locks at the opposite end, they are lowered gently to sea level again.

The canal goes through the great mountain chain which runs along the western side of our hemisphere from Alaska to the Strait of Magellan. These mountains begin at the Arctic Ocean and run almost to the Antarctic Ocean. We know of them in the Rockies and in the plateaus of Mexico and Central America. In South America they are the Andes. The range is lowest at the Isthmus of Panama, where the tallest of the peaks is not half a mile high. Where the canal crosses the mountains the land is only five hundred feet high, or about as high as the Washington Monument. It is only forty miles from coast to coast, but from deep water in the Atlantic Ocean to deep water in the Pacific it is about fifty miles.

The canal has, therefore, a length of fifty miles. Its bottom has a width of from three hundred to five hundred feet, and the depth is about forty-five feet. For twenty-

four miles the channel winds its way through Lake Gatun (gä-to͞on′), whose surface is eighty-five feet above the level of the ocean. The lake has an area of about one hundred and twenty square miles. It is formed by the Gatun dam, which we have built between two hills on the banks of the Chagres River. The dam holds back the waters of the Chagres, and by means of the locks on one side of it the ships are lifted up and down so that they can pass into or out of the lake. On the other side of the lake the mountains are five hundred feet above the level of the sea, but we have dug a wide ditch through them down to about forty feet above sea level so that the surface of the waters flowing through is at the same level as that of the lake. This ditch is known as the Culebra (ko͞o-lā′brä) cut. At the western end of it there are locks which raise and lower the vessels from and to the Pacific.

The work of making the canal was enormous. We shall not realize how great as we sail through. Nature has clad the sides of the ditch and the dam with tropical vegetation, and the canal now looks to be thousands of years old. It seems like a natural valley through hills unchanged since the creation of the world.

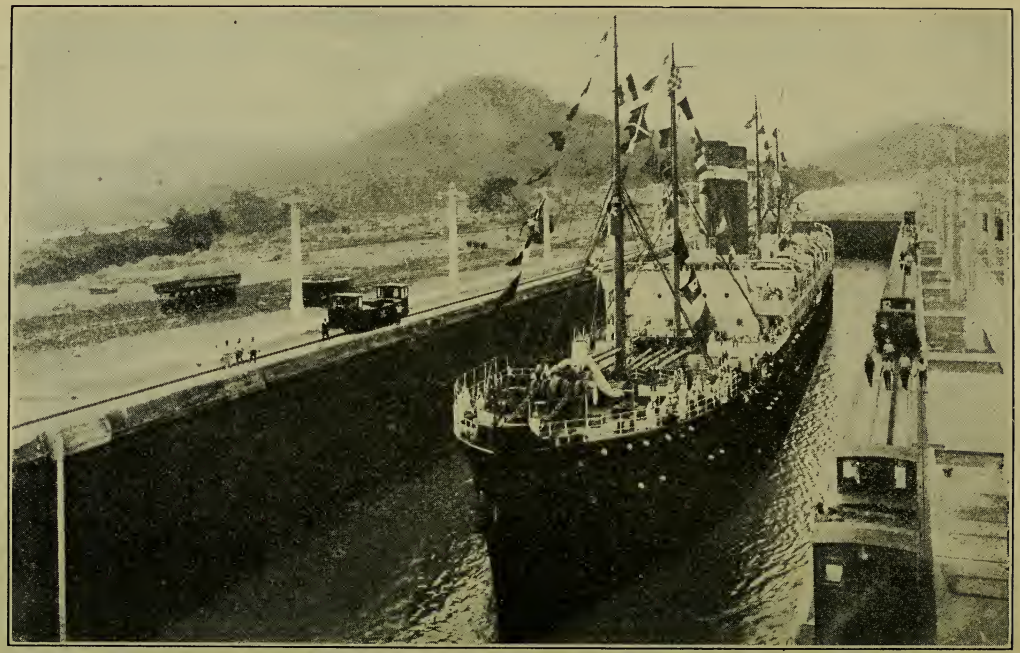
I visited the canal many times while it was building and the comparisons which follow were figured out by the engineers during the construction. The Culebra cut through the mountains required the blasting down and carrying away of so much earth and rock that it would equal a ditch three feet wide, three feet deep, and almost sixty thousand miles long. It would more than fill a ditch of that size reaching twice around the world at the equator and leave so much over that it would fill a hole through the center of the earth big enough for a Newfoundland dog to crawl through! The Gatun dam contains so much earth

and rock that it would take twice as many horses as there are in all the United States to haul the stuff if it were loaded on wagons. The locks on the canal have twelve great gates made of steel, which weigh fifty-eight thousand tons, and each gate has two doors made of steel plates fastened together by more than six million rivets.

At times as many as fifty thousand workmen were employed on the canal, and in one year the food required for them included five million loaves of bread, nine million pounds of meat, one million pounds of onions, and one thousand carloads of rice. The cost of making the canal, including that of the fortifications, was over four hundred million dollars.

The first vessel to pass through the canal was a steamer of ten thousand tons. It was the *Ancon*, belonging to the United States government, and it made the trip in nine hours. Its course was from the Atlantic to the Pacific, and the journey it accomplished, had there been no canal, would have required a trip around South America of about thirty-five days. That was on August 15, 1914. Within the next three months more than two hundred vessels carrying over a million tons of freight were thus lifted over from ocean to ocean, and ever since then a procession of steamers loaded with passengers and goods has been moving back and forth over this great artificial waterway. The number steadily increases, and the freight now passing through amounts to many millions of tons every year. The traffic is growing so fast that we may some day have to build a second canal through the isthmus or perhaps through Central America.

Indeed, it is hard to realize the saving in time and distance created by this short cut from ocean to ocean. During our Spanish War we needed one of our battleships

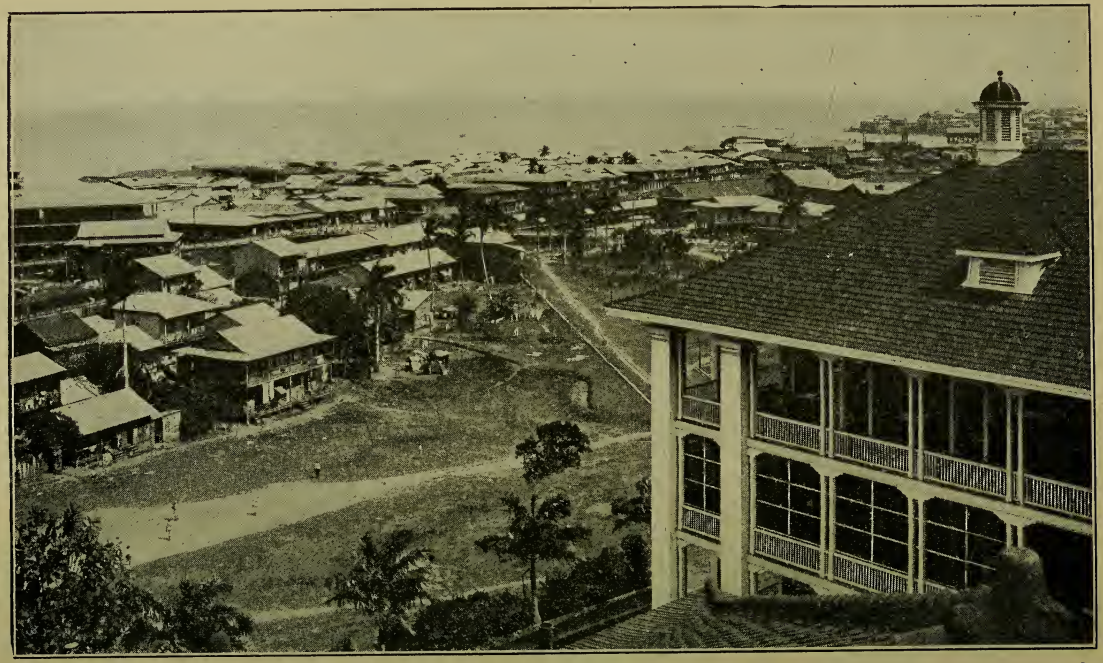


Vessels are drawn through the locks of the Panama Canal by electric locomotives running on a track on each side of the lock.

then in the Pacific to aid us in the Atlantic, and this vessel, the *Oregon*, had to steam from San Francisco to the southern end of South America and pass through the Strait of Magellan to come to New York. The distance that way is more than thirteen thousand miles. By the Panama Canal it is a little more than five thousand miles, and the saving in time is three or four weeks. The canal will be of great value in sending our ships from one coast to the other in time of war. In 1919, after the World War in Europe, the entire Pacific fleet of the United States navy passed through the canal from the Atlantic Ocean to the Pacific within a few days.

By the canal, Honolulu is seven thousand miles nearer New York than by the Strait of Magellan, and the saving in going to Manila is almost one thousand miles more. The west coast of South America has been brought almost into the front dooryard of our Atlantic seaports. Guayaquil (gwī-ä-kēl′), Ecuador, is now seven thousand miles nearer New York. New Orleans is nearer to Peru than to any port of Great Britain.

But we shall appreciate the canal better as our vessel goes through it. We steam past the Toro lighthouse inside the great breakwaters, built to defend the canal from the storms of the Caribbean Sea, and enter Limon (lē-mōn′) Bay. We pass Cristobal, with its statue of De Lesseps on the point and the coconut trees half hiding the houses, and enter the ditch, steaming on until at seven miles from the breakwaters we come to what, at first, look like huge fortifications of white stone with a long wall of green sod on each side of them. The wall of green is the Gatun dam, and what seem to be forts are really the mighty locks of concrete which will raise us by three steps to the level of Gatun Lake.



Panama City is the capital of the Panama Republic. It adjoins Balboa near the Pacific end of the canal.

As we approach, the iron gate of the first lock opens and we steam into a chamber, the walls of which extend high above the deck of our vessel. Now the gate closes. The water bursts through the floor of the lock. It is boiling and bubbling, and our steamer is rising. The deck is soon high above the walls, and we are floating on the level of the water of the second lock chamber. The huge steel gate in front of us slowly opens, and our steamer is towed by the electric locomotives, which run along the top of the locks, into this second chamber. There are four locomotives. Two are fastened to the front of the vessel, moving it onward; and the other two are on the tracks at the rear holding it so that it can go only so fast and no faster.

Now the gate behind us has closed. The water flows in from the bottom and again our ship rises until we are on the level of the third lock. We are towed into this, and in a similar way are raised to the level of Lake Gatun. We are now eighty-five feet above the waters of the Atlantic, and we shall move on at this level across the isthmus until we reach the locks through which we shall descend into the Pacific.

The voyage across the lake is delightful. Our course winds in and out among beautiful islands, and we now and then pass floating islands, patches of the tropical swamp which have been lifted from their beds by the floods of the Chagres River and are carried by the winds here and there over the lake. Some of these islands are several acres in area. They rise and fall on the waves made by our steamer as we go by. Here and there we see dead trees rising out of the lake. Some are as white as the bones of a skeleton, and others green with the orchids and other air plants with which they are loaded.

The islands and the shores of the lake are a tropical jungle with palms of many varieties rising above it. Here and there we see strange birds in the trees. Some of them have gorgeous plumage, and among them are blue and white herons with aigrettes of beautiful feathers high on their heads. There are also ducks and pelicans swimming on the water. The pelicans are huge birds with great bags in their throats in which they store the fish they catch until they need them for food. On one island we see two alligators sunning themselves on the edge of the water.

Now we have crossed the lake and have steamed by the place where the Chagres River flows in. Just opposite the mouth of the Chagres is the highest point on the Canal Zone. It is seven hundred and fifty feet high. The canal has now narrowed to three hundred feet. We are entering the Culebra cut where the greatest of the excavations were made. The hills are now high above us and we are in a narrow channel steaming along between sloping walls of the greenest of green. The rock and earth which once formed the banks of the canal are now covered with grass and flowers. Palm trees and fern trees have grown up here and there, and we are sailing through a garden of tropical wonders. There are but few marks of the steam shovels and other great engineering machines which aided in digging this part of the canal.

We steam for nine miles through the cut, and then come to the lock of Pedro Miguel (pā′drō mē̇-gĕl′) which drops us thirty feet into beautiful Lake Miraflores (mē′rä-flō′rās). It is much smaller than Lake Gatun, and we soon cross it to the locks on the opposite side, which, by two steps, lower us to the level of the channel through which we sail out to Balboa (bäl-bō′ä), the port on the Pacific Ocean. There is a huge breakwater at Balboa, and the sea beyond

it is spotted with islands which stand like sentinels guarding the works. Fortifications have been built upon one of them just beyond the breakwater, and we have mighty guns there to guard the canal. There are also fortifications on islands near the Atlantic entrance, and hidden forts in the jungle which lines the waterway in places, so that it will be easy to defend the canal in time of war.

1. Tell in your own words the story of the discovery of the Pacific Ocean by Balboa and by Magellan.

2. Describe the Isthmus of Panama. Why is it the best place for the Panama Canal? Show the saving in miles made by the canal in the distance between ten great ports of the world. Contrast the routes from Callao and Valparaiso to Liverpool, Havre, and Gibraltar, via the Strait of Magellan and the Panama Canal. From the same ports to New York, Boston, and New Orleans. Take a trip from Rio de Janeiro to Shanghai via the Suez Canal. Via the Panama Canal. (See Tables I and II.)

3. Who first tried to build the canal? Why did they not succeed? Write a description of your trip through the canal. Explain how ships can be raised and lowered by means of the water in the locks. Is the water which raises the ships fresh or salt? Why?

4. Give some of the advantages of the canal to the commerce of the world — of our eastern and western states. Why is it of great value to us in time of war?

5. How does the canal affect our islands in the Pacific Ocean? Make a voyage from New York to Hawaii, the Philippines, and Samoa, by the canal. By the Strait of Magellan. By Suez. How long is each voyage and how much time would you spend on the way?

6. How long is the Canal? How wide? How deep?

7. Compare the Panama with the Suez Canal. (See Carpenter's "Africa.") With the St. Mary's Canal. (See Carpenter's "North America.") With the Manchester ship canal. The Kiel canal. (See Carpenter's "Europe.") Why do we need forts at Panama?

V. THE REPUBLIC OF COLOMBIA

WE are sailing southward this morning upon the mighty Pacific. We left Balboa two days ago, going out just as the sun was setting over the islands of Flamenco, Perico, and Naos. We sailed past those islands, turned southward, and are now a little north of the equator, moving along the coast of Colombia. We are in the doldrums or zone of equatorial calms where there is so little wind that it is sometimes difficult for sailing vessels to cross it on their way to or from our canal. The air is almost still and the sea seems to steam. How bright the sun is and how dazzling! It darts its rays down and millions of diamonds are dancing upon the waves under our eyes. We wink and blink as we look. The reflected rays of the sun here are brighter than its rays in July at our homes.

Stand with me at the side of the ship and look out toward the west. Notice how the blue waves stretch on and on until they lose themselves in the sky. That water extends westward for ten thousand miles until it wraps itself around the Philippine Islands off the coast of Asia. We are near where the Pacific is widest. It is the greatest

of the oceans, and it holds two fifths of all the salt water on earth. It is now crossed by many trade routes whose focus is the Isthmus of Panama, and all the countries on the west coast of South America are sending their goods northward to take advantage of this short cut into the Atlantic.

But what is that cackling and crowing and quacking we hear? Can that be the baa of a lamb? Was not that the moo of a cow? We rub our eyes to see if we are not dreaming. This voyage of ours must be a mistake, and we are surely back near one of the farmyards in the country at home.

No, it is not a mistake. The noise of the fowls comes from those two-storied coops on the deck. You can see the chickens and geese poking their heads through the slats. The bleating and mooing is from sheep and cattle kept in stalls two floors below. They are carried to furnish the meat for our tables.

What a noise the creatures make! We are awakened by them every morning and hardly know where we are until the cabin boy brings in our breakfast. It consists of a small cup of coffee and one or two slices of bread, and, protest as we may, we cannot have more until eleven o'clock. This is the custom throughout South America. Between eleven and one they have a second breakfast, which is much like our luncheon, and their dinner is at about six in the evening. We grumble at first, but soon find it as pleasant as our way of eating at home.

Now the steamer has slowed up and turned to the east. We are sailing into one of the ports of Colombia. There are palm trees and bamboos on the coast, and the dense vegetation behind is much like that of the isthmus. There is a town situated on a little island at the head of a bay

which forms an excellent harbor. It is composed of thatched huts and of one- and two-story white buildings covered with plaster and roofed with red tiles. There are some sailing vessels at anchor in the harbor, and many small boats in which dark-skinned men are rowing out to our steamer. We are now in the Bay of Buenaventura (bwā-nä-vĕn-to͞o′rä), and from here we shall make a long tour through Colombia.

The bright yellow pods of the cacao tree grow along the branches. They contain the seeds from which chocolate and cocoa are made.

The country is so vast that we cannot expect to visit it all. Colombia is as long from north to south as from St. Paul to New Orleans, and its area is about ten times as large as the state of Pennsylvania. The land is one of mountains and plains. The Andes run through it in three high ranges, and between them are some of the most fertile river valleys of all South America. To the east of the mountains, sloping down to the basins of the Orinoco and the Amazon, are vast plains which fur-

nish pasture for millions of cattle and sheep; and agriculture thrives on the plateaus and in the high valleys. Down here on the seacoast the climate is tropical and the thermometer often rises to more than one hundred degrees above zero. On the high peaks of the Andes the snow and ice never melt, while in the lofty valleys and plateaus it is temperate all the year round.

We shall observe the differences in climate as we make our way over the country. We take the little narrow-gauge railroad which extends from Buenaventura into the interior, and then go on mules over the hills into the valley of the Cauca (kou'kä) River. This is one of the most fertile regions of Colombia, and it is typical of the rich Andean valleys. It is an almost level plain about two hundred miles long and twenty miles wide, through which runs a beautiful stream navigated by small steamers. The soil of the plain is fertile, and the country is covered with plantations of sugar cane, cotton, coffee, and the cacao from which our chocolate is made. There are great fields of bananas and large orange groves. There are many lemon trees, and we make lemonade of the fruit which we pick from the branches.

We stay one day with a farmer who takes us through his cacao plantation. He has thousands of trees, and we ride with him through one orchard after another. How beautiful everything is! The cacao trees look like lilac bushes, except that they are from fifteen to thirty feet high. They are ragged and gnarly with leaves of bright green. The cacao fruit is so large that if it lay on the ground you might think it a little squash or a big ripe cucumber. It is of a bright lemon color streaked with red. Its stem is attached to the trunk and large limbs, and not to the ends of twigs like apples or pears.

To show us, the planter chops one of the pods in two with a knife. It has a thick skin, and inside this is a white pulp in which are imbedded about thirty dark-brown seeds much like large lima beans. From these seeds are made the chocolate and cocoa of commerce.

The fruit is gathered when ripe and the seeds are washed out of the pulp. They are dried in the sun and shipped to factories in different parts of the world. In the factories they are ground, and from their meal, after several processes which take out some of the oil, the pure chocolate is made. From the seed hulls, in much the same way, comes the cocoa.

In another part of the plantation we learn how the trees are grown. The seeds are first planted in hills about fifteen feet apart, three seeds being put in each hill. They soon sprout, and at first look not unlike small orange trees. They are cultivated and the weeds are kept down. After three or four years they begin to produce fruit, and continue to yield for thirty years and more.

We shall see many cacao trees in other parts of Colombia. Most of the cacao of the world is grown in Africa and South America, and this product is one of the principal exports of Colombia, Ecuador, Venezuela, and Brazil. Much of the chocolate we drink or eat in cakes and candies comes from the valley of the Cauca. Some of it is carried over the mountains to Buenaventura, from which port it goes by way of the Panama Canal to New York. Some is shipped down the Cauca River and through the Magdalena (mäg-dä-lā′nä) River to the Caribbean Sea, and thence to our country.

The people of the Cauca valley are noted for their hospitality, and their country has been called "The Land of the Gentle Yes," because the people hate to

say "no" to any request. They are a mixed race of Spaniards and Indians. They are simple in their tastes, their chief business being farming and fruit raising.

We visit Cali (kä′lē), which is near the head of the valley and its chief commercial center. It is a thriving little city with houses of stucco and roofs of red tiles. It is several hundred years old, but is rapidly growing. It now has electric lights run by the falls of a mountain stream which empties into the Cauca.

Our next trip is down the Cauca River on small steamers which carry us into the Magdalena River and thence out to the coast. Here we visit the seaports of Barranquilla (bär-rän-kēl′yä) and Cartagena (kär-tä-hā′nä), each of which is several centuries old. Barranquilla is on the edge of the delta and is connected with the seaport of Sabanilla (sä-bä-nēl′yä) by a railway twenty miles long. Cartagena is on the Caribbean Sea, and it has a railway to the Magdalena River. Another important seaport, as far as the United States is concerned, is Santa Marta, which has also a small line of railroad going into the interior. It is there that we find the enormous banana plantations belonging to one of our fruit companies, from which vast quantities of bananas are shipped to New York and Boston.

VI. UP THE MAGDALENA TO BOGOTA

WE have left the seacoast and are again on the wide Magdalena River steaming slowly southward into the interior of Colombia. Our boat is a stern-wheeler much like those on the Ohio and Mississippi rivers, but it draws only four or five feet of water. Many parts of the

river are shallow, and we have to steer this way and that to avoid the sandbars and islands which are continually forming from the material washed down from the Andes. The river is wide where we come in from the sea, and big ocean vessels go as far inland as Barranquilla. Farther south it narrows, but it is often a mile wide, and in the

Some of the boats on the Magdalena River are propelled by a wheel at the stern, like those on the Ohio and Mississippi.

lowlands it flows through a tropical jungle where the trees are matted together with vines and the palms wave their fanlike branches over the water.

Now we pass a village of thatched huts, about which are little groves of bananas, and now go by sandy islands where the alligators may be seen sunning themselves. On one islet we count eighteen of these monsters asleep on the shore. The river is full of fish which often become frightened by the steamer and jump high out of the water. Thousands of queer-looking birds are to be seen, and we now and then frighten a flock of parrots, cranes, pelicans, or flamingoes,

which flap their great wings as they rise from the river. The flamingoes are of a bright pink, and they fly in a rosy stream high over our vessel.

Our fuel is wood, and we have to stop often for a supply for the engines at the little stations here and there on the

Spinning room in a cloth factory, Colombia.

banks of the river. At such times we get off and walk about on the edge of the jungle, cutting canes from the clumps of bamboo, gathering orchids, or trying to spear some of the big fish for which the Magdalena is noted.

About a week after leaving Barranquilla, we arrive at a port from which a railroad is building to the thriving city

of Medellin (mā-thĕl-yēn′), which lies high up on the mountains in a rich gold and silver mining region, and a little later stop at La Dorado, where we take a railway around the rapids to Honda (ōn′dä). Here we hire mules and climb for two days up the hills to the high plateau upon which Bogota (bō-gō̤-tä′) is situated.

Honda is half as far from the mouth of the Magdalena as St. Louis is from the Gulf of Mexico, but the river extends hundreds of miles beyond so that small steamers can go a long distance into southern Colombia. There is a considerable fall at the rapids, and they will probably be used some day to generate power for manufacturing.

Bogota is nearly as far from the Caribbean Sea as Detroit is from the Atlantic Ocean. The city is more than eighty-six hundred feet above the sea level. It is higher than Mexico City but lower than La Paz or Quito (kē′tō), or Lassa, the capital of Tibet. Although it is near the equator it has a climate much like our spring all the year round. Roses and lilies are always in bloom, and beds of blue and white violets load the air with perfume. Strawberries are to be had from January to December, and in the markets we can buy peaches, apples, and pears, as well as the most delicious pineapples, oranges, and bananas, which come from the tropical valleys much lower down.

Bogota lies on the eastern edge of a beautiful plateau, with its streets climbing the hills at the back. The plateau is about sixty miles long and thirty miles wide. It is covered with farms and spotted with little white farmhouses whose dark-red roofs shine under the sun. It has green pastures upon which fat cattle are feeding, many fields of potatoes, and great patches of wheat and barley, which are rising and falling under the winds.

We spend some time in Bogota. It has nearly one hundred and fifty thousand inhabitants, most of whom are of the mixed Spanish and Indian race. There are also many Indians who have come in from the country about. The men have on white trousers and shirts, and sometimes also a poncho, or blanket, which they wear over their shoulders, sticking their heads out through a hole in the center. The Indian women wear dark clothes, and nearly all have on straw hats like those our boys wear in the summer. Many of them carry heavy burdens on their backs, held there by straps about their heads or shoulders.

Most of the citizens of Bogota are white. They are largely of Spanish descent, and many of the children have rosy cheeks caused by the fresh, bracing air. These people dress much as we do, but the women, when they go on the street, wear black gowns and have black shawls on their heads. Many of the men wear tall hats and nearly all carry canes.

As we walk about the city we see many fine horses with men and boys riding them. There are also ox-carts and wagons and countless donkeys with loads on their backs. Donkeys and mules are the chief beasts of burden. Bread, vegetables, and fruit are carried about from house to house upon them, and scores of the little animals are to be seen in the market, where they have to wait until their masters sell the produce they have brought in from the country.

Bogota is a Spanish-built town, and its low houses run around *patios* (pät′yōs) or little square gardens, so that our bedrooms look out upon beautiful flowers. The houses are close to the street with strong iron bars over the windows, and their outside walls are painted in all the colors of the rainbow. Most of the roofs are of red tiles. There are many churches. The people are Roman Catholics, and we meet priests and nuns as we go through the streets.

The best part of the city is about the Plaza Bolivar (bō-lē′vär), a beautiful park with gardens of flowers and tropical trees. On one side of it is the national capitol, or government building, and on another the cathedral. On the remaining two sides, with arcades before them, are stores containing goods from all parts of the world. There are many people shopping, and in the evening the city and parks are thronged with men, women, and children.

Bogota has electric street cars, telephones, and electric lights. It has many automobiles and all modern civic improvements. Its streets are paved with asphalt, and it has several beautiful squares and parks in which are statues of the nation's heroes. In the Plaza de España is the bust of Cervantes, the author of "Don Quixote." The city has public libraries, and there are daily newspapers printed in Spanish. It is the capital of Colombia, and in it are the houses of Congress and the homes and offices of the president and other officials. We are told that the republic is modeled after the United States and that its government is very much like ours. There are many soldiers on the streets of Bogota, and we are awakened each morning by the trumpeters calling the troops out to drill. There are good public schools, and the government has established post schools, aviation schools, and schools to teach farming. Bogota is sometimes called the Athens of South America.

There are now automobile roads in many parts of the country, and we motor out through a valley underlaid with beds of coal to see Tequendama (tā-kān-dä′mä) Falls, which are within an hour's ride of the capital. These falls are three times as high as Niagara, dropping in one perpendicular plunge four hundred and fifty feet. Their volume of water is small compared with that of Niagara, but they create the electric power for the city.

VII. EMERALDS AND PLATINUM

HOW would you like to have a mine of precious stones more valuable than diamonds, or a bed of gravel sprinkled with grains of a white metal worth several times its weight in gold? We can find both in Colombia. The precious stones are emeralds, gems of translucent green which are among the most beautiful jewels known, and the metal is platinum, of enormous value in the industrial arts.

We shall see the emerald mines first. Colombia produces the purest and most beautiful emeralds from mines near Bogota. In ancient times the best emeralds were mined in Upper Egypt near the Red Sea. Cleopatra wore beautiful stones from that region, and the Emperor Nero is said to have had a large Egyptian emerald, which he used as an eye glass to view the lions and gladiators fighting in the Colosseum. Pliny, the Roman historian, describes the statue of a lion on the shores of Cyprus, which had emerald eyes so brilliant that when the sun shone on them they frightened the fish.

Shortly after South America was discovered, five great emeralds were taken from the Indians of Peru and brought back to Spain. One of these had been cut into a rose, and the second into a horn; a third was a fish with golden eyes, and the fourth a bell with a pearl for a clapper, while the fifth was a tiny cup. So far no mines of emeralds have been found in Peru, and those stones may have come from Colombia. From here also came the "Duke of Devonshire," one of the most valuable emeralds ever found.

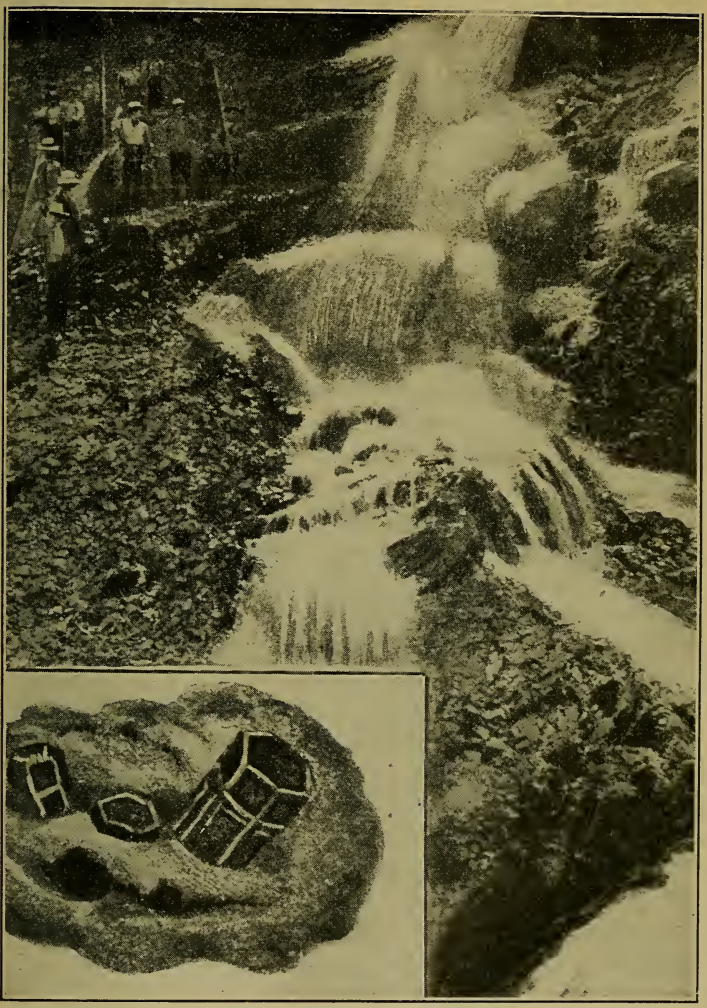
The purest and most beautiful emeralds are worth far more than diamonds of the same size. They are so valuable that one of us could carry in his pockets enough to be a great fortune. The mines at Muzo (mo͞o′so͞), Colombia,

which we shall visit, now belong to the government, and the output of one year amounts to hundreds of thousands of carats. There are large tracts in which the emeralds are found, and it will be many years before the mines are exhausted.

We take the railroad at Bogota and ride several hours to the little town of Zipaquira (sē′-pä-kē̆-rä′), where we get mules and climb over the hills to the mines. The country is rough and the trip takes us three days. We go first over a mountain spotted with salt mines, then across a cold, dreary plateau, and climb down into a valley which is about a mile above the sea level. Here we again see how latitude and altitude affect climate. The weather is hot and there are orange groves and coffee plantations. The next day it is bitterly cold, for we are climbing another high range of mountains. We then descend into a valley and later climb over mountains so steep that we are tired out when we at last reach the old village of Muzo, which has been the center of the emerald industry for hundreds of years.

The emeralds are found not far from the town. They lie on the steep slopes of a mountain covered with woods. The earth is first cut away, and under it are beds of black limestone and shale containing a network of white veins in which crystals of emerald are embedded. When taken out each is a six-sided prism of the richest green color.

The mining is done by Indian laborers, who clear away the earth and rock from above, and then break up the limestone with crowbars, picking out the emerald veins with their hands. The precious stones are then carefully separated from the rock and are sent to London or New York to be cut into jewels. The Indians are guarded day and night by watchmen. They live in little huts near



Mining emeralds in the Andes. Below is a piece of the rock with the emeralds showing. Each is a prism of purest green.

the mines and are not allowed to keep chickens for fear that the fowls, in scratching for gravel, may swallow some of the emeralds and hide them away in their craws.

Leaving Muzo, we make our way back to Bogota, from which we go to Honda and thence ride on muleback for days over the mountains and valleys to the seaport of Buenaventura, where we entered Colombia. All the way we hear much and see something of the minerals of Colombia. The northern Andes are one of the world's treasure vaults, and they contain valuable beds of iron, copper, lead, silver, and gold. They have been mining gold in Colombia since the Spaniards conquered the Indians, and within that time more than seven hundred million dollars' worth has been taken out of the rocks and from the beds of the streams. Gold is to be found in every state of the republic, and color or traces of the precious metal in the gravel of almost every stream. One of the richest gold mining sections is Antioquia (än-tē-ō′kē-ä), where Medellin is the chief city, and there are silver mines farther south in Tolima (tō-lē′mä) and Cauca. Copper has been discovered in five different states, and beds of coal are known to exist. The country has also valuable fields of petroleum.

The most interesting of the minerals of Colombia is platinum. This metal is rare, most of the world's product coming from the Ural Mountains in Russia. Until the World War, Russia was producing nine tenths of all that was mined, but since then a great deal has been exported from Colombia. The platinum is found mixed with other metals in the gravel of the streams. It is washed out and separated and then sent to the market.

Platinum has a value several times greater than gold. It is not dissolved by acids or melted by a very high tem-

perature, therefore, it is indispensable in many chemical operations. It is used in making munitions and nitrates, and for this purpose was very important in the World War. At that time our supply from Russia was cut off and all we used came from Colombia. Platinum is used also in dentistry, and I doubt not that some of us have bits of platinum in our teeth which have been filled. It is employed as a setting for diamonds and other precious stones, and it makes the most costly of jewelry.

Platinum can be pulled out into wires as fine as the hair of a baby, so fine that twelve hundred of them, laid side by side, would cover a width of only one inch.

1. Trace our journey from Panama to Colombia. Compare the Pacific with the other great oceans. What islands of the Pacific belong to us? How did we acquire them? Which group is the largest? The most valuable?

2. Compare Colombia with your own state as to size and climate. How do mountains affect climate? Why has Bogota, so near the equator, cool weather and the fruits and grains of the temperate zone? What is the government of Colombia?

3. What is cacao? From what countries of the world does it come? (See Table XVI.) Make a visit to a cacao plantation and trace a box of cacao beans from there to New York. How is chocolate made? What candy do we get from cacao? (See Carpenter's "How the World is Fed," pages 317–322.)

4. What other important tropical fruit do we import from Colombia? How is it raised? From what seaport does it come? What does it cost at your home? Tell the story of its travels if it came from Colombia. (See Carpenter's "How the World is Fed," page 271.)

5. Contrast the principal river of Colombia with the principal river of the United States. Describe a trip up this river. Make a list of the animals you see along its banks.

6. Would you like to live in Bogota? Why? Describe the city and its inhabitants. What great falls are near by? How do they compare with Niagara Falls?

7. Describe your visit to the emerald mines. Compare these precious stones with diamonds, sapphires, and rubies. (See Carpenter's "How the World is Clothed," chapters 35 and 39.)

8. What is platinum? Give some of its uses. From what two countries does the most of the world's supply come? Why was it of value in the World War? Mention other important minerals that come from Colombia.

VIII. A LAND OF THE EQUATOR

WE have left Colombia, have steamed along the northwest coast of Ecuador, have sailed by the Galapagos (gä-läp′ä-gŏs) Islands, noted for their enormous turtles, have called at the ports of Esmeraldas (ĕs-mā-räl′däs) and Bahia (bä-ē′ä), and are going up the Guayas (gwī′as) River to Guayaquil, the chief seaport of the country. It was only yesterday that we crossed the equator, and we are now a little south of that line in one of the hottest regions of the world.

Ecuador is the Spanish name for equator, and the country lies on both sides of that line. It is more than twice as large as Illinois and almost as large as the United Kingdom of Great Britain and Ireland. It has rivers that flow into the Pacific Ocean and also some that go down into the Amazon and the Atlantic.

Ecuador consists of a strip of low land along the Pacific Ocean about eighty miles wide, running back to the foothills of the Andes; of the wide Andean highlands; and of their eastern slope, which falls rapidly to the vast forests of the Amazon basin. Only the lowlands of the east and west are tropical. The climate grows steadily cooler as one climbs the slopes of the Andes, and in the high valleys

and plains upheld by these mountains, having an average height of more than a mile and one half above the sea, the climate is like spring all the time. Indeed, as we go from the seacoast to the tops of the Andes we shall find every kind of climate from the torrid to the frigid zone, the higher peaks being clad with perpetual snow.

Along the coast it is easy to realize that we are still in the tropics. Look at the city of Guayaquil as it lies on the banks of the river. There is not a chimney rising above any of the houses, and the buildings are made without glass windows, mere holes in the walls serving for light and air. The town does not need furnaces, and heating stoves are unknown.

The dark-skinned boatmen who have rowed out to the ship to take us on shore wear but little clothing, and as we land at the wharf we see half-naked babies playing about near their mothers, who sit in the shade of the buildings peddling oranges, pineapples, bananas, and other tropical fruits.

How the sun beats down upon us as we stand in the street! We have on thick hats and we carry umbrellas. We are warned to walk in the shade and to stay in at midday. Guayaquil has often been very unhealthy, but it is said

Landing place and market, Guayaquil. The canoes are dugouts, each made from a single log by the Indians.

to be safe for tourists and others to-day. Nevertheless, it has had yellow fever and bubonic plague, and we shall always sleep under mosquito nettings at night.

Let us leave the wharves and go farther over into the business section. Now we are walking under arcades by one store after another. It is like passing through a museum or a bazaar in the East Indies. The shops are all open. The front walls have been folded back or taken away for the day and the goods are piled upon the counters and stacked on the floors.

What a queer throng is this that moves along in the shade! There are white women in black gowns with black shawls over their heads. There are Indian girls in bright-colored dresses and straw hats, and copper-skinned Indian peons, or workmen, who trot along carrying bags of cacao and other wares on their backs.

How many donkeys there are in the street! Here comes one loaded with lumber. He has three long boards strapped on each side his back and he clears the whole roadway when his master turns him about. There is another carrying two large wooden boxes, between which his head peeps out. That is the bread wagon of Guayaquil, and the boy who is dragging the animal onward is probably the son of the baker. There are other donkeys carrying vegetables and fruit in panniers, and we see that these little animals here take the places of our huckster carts, carriages, and drays.

But what is the matter with that donkey's legs? He seems to have on trousers, and there is a band of cotton cloth on the under side of his body. We see other donkeys dressed the same way, and when we ask why are told that the gnats and flies are so bad in Guayaquil that the donkeys and mules often wear waistbands and trousers.

Let us take a walk through the city. It is laid out in

squares and runs for about two miles along the shores of the river. The streets are paved with asphalt or blocks of gray stone. Many of them are lined with trees, and there are beautiful parks in which we can rest under the shade of the palms. The town has some large buildings, but most of the houses are of one or two stories, made in such a way as to withstand the earthquakes which are common in Ecuador.

We stop for a moment before a house in the process of building. The dark-skinned carpenters are nailing bamboo laths on the framework of the structure and covering them with a thin coat of plaster. That is to be the outside of the house. When finished it will look as though it were made of brick or stone covered with stucco, but in fact it will be so thin that one could easily ram a hole through it with a fence rail. See how the beams and rafters are made in sections and fitted together so that they will give and not break if an earthquake occurs. Heavy buildings might fall at such times, but these light structures rock to and fro and do not come down.

Guayaquil is one of the best ports on the west coast of South America. It is eight hundred and thirty-five miles from Panama. It lies on the Guayas, the only navigable river which flows into the Pacific Ocean between San Francisco and the Strait of Magellan. The river is a mile wide where it faces the city, and so deep that it furnishes a safe harbor for large ocean steamers. The port is sixty miles inland, and the Guayas forms a waterway to much of the lowland which borders the coast. We find the stream filled with shipping and see many dugouts and cargo boats which have brought in cacao, cane sugar, and ivory nuts for export.

There is a railroad which goes from Guayaquil up the

Andes to Quito. The distance is two hundred and ninety-seven miles, and the trip can be made in less than two days. There are also many mountain trails down which goods are brought to the port. There are little steamers which will take us up the Guayas River almost to the foot of the mountains, and we can go from there to Quito across country by mules. We shall travel that way in order to study the lowlands and learn about the highlands as we climb up through the passes to the Andean plateau.

We leave Guayaquil at night on a small steamer and awake to find ourselves moving in and out among little frame houses built high upon piles surrounded by water. It is the rainy season in Ecuador and the low coast lands are flooded. The people are now living as high above the ground as the second stories of our houses at home, but their buildings seem to be floating. We see them going from hut to hut in canoes. There are marketmen rowing about; the schoolhouse is on piles, and we see children in boats being paddled to school.

This town is Bodegas (bō-dāg′äs), the head of navigation of the Guayas. Only a small part of it is on the mainland, and this is half flooded. The street crossings of that section are bridged with logs, and the people have to hug the walls and step upon blocks in getting from one store to another along the side streets.

Many of the houses are far out in the river. The smaller ones have only one room. They are made of poles covered with palm leaves, and are reached by ladders from the water. Let us take a canoe and visit one of them. The owner makes us welcome, and we sit down on a block on the floor, holding ourselves rather gingerly for fear the floor may break through and drop us into the water. See, the floor is made of bamboo canes with wide cracks between them.

The women do not need to sweep, for the dirt falls through into the river, or to the ground when the stream has gone down.

Notice that clay pot resting on the fire in the box over there. That is the cook stove of the family. These people use charcoal for fuel. They live largely upon sweet potatoes or yams, plantains or large bananas, and a potato-like tuber called the yucca. They are fond of rice, and eat a great deal of beef dried in the sun.

Leaving Bodegas, we start out for a trip through the lowlands before climbing the Andes. We ride for miles in canoes among the trees of the tropical forest, stopping to gather the orchids and other beautiful flowers with which they are loaded. Now monkeys make faces at us out of the branches, and now a bright-colored parrot scolds as we go on our way. We frequently see alligators which swim lazily off into the bushes, and now and then take a shot at one, but the beast dives at the sound and we cannot tell whether we have hit him or not.

In the more elevated country we see cacao plantations and tagua palm trees which look like gigantic ferns with green balls of fruit as large as our heads. The fruit of the tagua is in bunches at the base of the leaves. It looks like an enormous chestnut bur, but it is really a palm bur eight or ten inches thick containing a dozen or more nuts as big as the fist of a small baby, which, when green, are filled with a soft jelly-like substance tasting not unlike coconut milk. When the nuts grow ripe they become as hard as bone. They are then gathered and shipped to different parts of the world to be used as vegetable ivory. The kernel of the nut has a texture very much like elephant ivory. It is so hard that it can be sawed, carved, and turned into all sizes and shapes. It is white, but it can

Ivory nuts. The fruit of the tagua palm furnishes material from which millions of buttons are made.

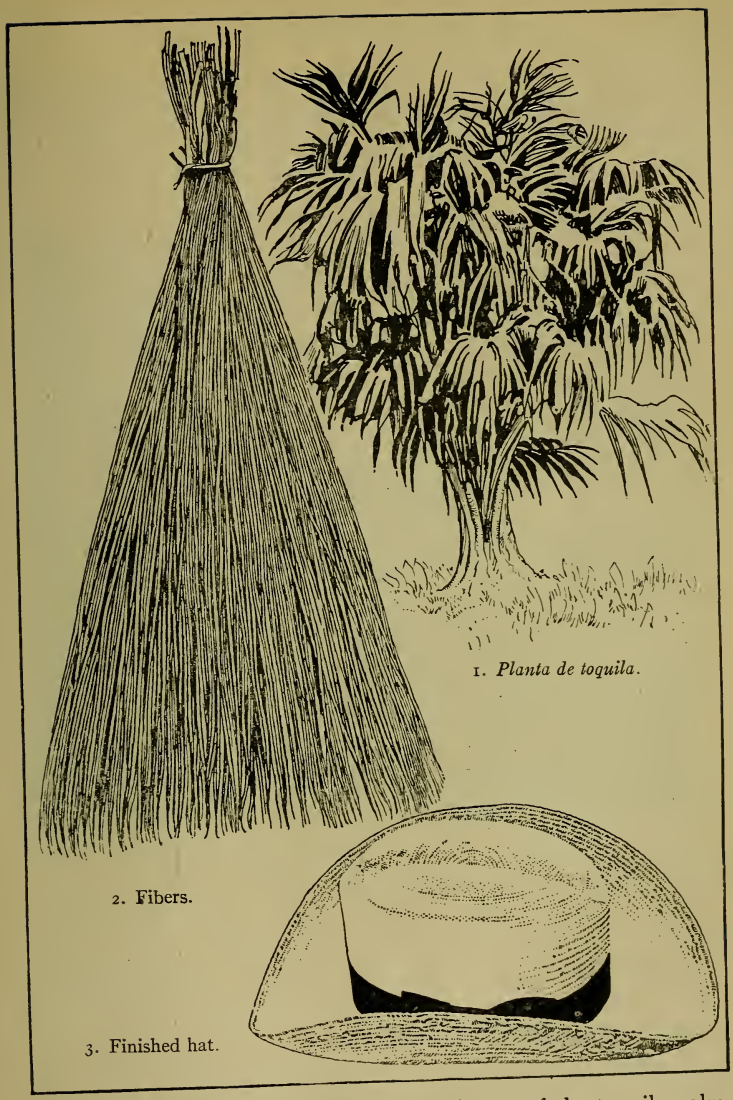
be dyed and it takes a most beautiful polish. The tagua tree is found also in Colombia and Panama.

It is from such nuts that many of our buttons are made. Ecuador exports more of the nuts than any other part of the earth, and the United States buys over twenty million pounds of them every year. We have over a score of vegetable ivory factories and they turn out bushels of buttons a week.

There is another palm in this region which supplies large quantities of goods for export to the United States. This is the *planta de toquila* (tō-kē'lä), from the leaves of which comes the fine straw for making Panama hats. The tree grows wild in this hot, humid region, and the hatmakers go about and gather the leaves, which they tear apart into the fibers used for weaving. Thousands of women and children are engaged in this work. The finest hats are woven under water, as the straw becomes brittle when exposed to the sun.

The most beautiful hats take a long time to make, and they sometimes sell for as much as one hundred dollars apiece. The children can weave two of the cheapest grade of hats in one day. The hats are called Panamas because they were formerly sent to Panama and thence shipped to New York. They are made in Colombia, Ecuador, and Peru; but the most and the best come from Ecuador.

Ecuador exports rubber from the wild trees of its lowlands and also some coffee, famous for its fine flavor. The country is supposed to have deposits of gold, silver, copper, and petroleum, but they are but little developed. The trade of Ecuador with the United States has increased enormously since the Panama Canal was built. Cacao is the chief export, amounting often to one hundred million



Genuine Panama hats are made from the leaves of the toquila palm.

pounds in one year. We buy most of its rubber, ivory nuts, and cacao, and sell to it machinery, railway supplies, cotton and woolen goods, and foodstuffs.

IX. CLIMBING THE ANDES TO QUITO

WE have left the lowlands of Ecuador and are on our mules climbing the great mountain wall of the Andes. The road is so narrow in places that we go single file, and often so steep that we fear we may slip off behind. We ford many streams, making our way in and out through the bowlders and throwing our legs high on the necks of the mules to keep our feet out of the water. Now we ride along narrow ledges, shuddering to think what would happen if the animals should slip in the mud and slide off into the deep cañon below. The going is worse farther up and we heartily agree with the natives, who say their roads are for birds rather than men.

As we ascend the air becomes fresher and cooler. The coffee and cacao trees have now disappeared. We have left the tropical forests, and we are in a region of less luxuriant vegetation. The trees and plants continue to change as we rise. They grow smaller, and at last we are so far above the sea that there are no trees at all.

How cold the wind is! We shiver under the blankets in the rude huts where we stay overnight, and are very uncomfortable. Our beds are wooden platforms which seem to seek out every bone in our bodies. We are tormented with insects, and the chickens and dogs run in and out of the rooms where we are trying to sleep.

Still farther on we reach a plain which is higher in the

air than the top of Pikes Peak. It is covered with sand, and the wind almost blows us off our mules as we ride over it. This is the Arenal, the pass of the Andes through which we enter the high central valley where most of the people

Mountain trail in Ecuador. Most of the people of Ecuador live on high plateaus, many of which can be reached only by trails like this.

of Ecuador live. Ecuador is situated in the torrid zone, but it has all kinds of climates.

Now we have gone over the pass and, descending a little, are soon on our way up the valley toward Quito. We are almost two miles above the sea, with some of the highest

of the Andes in sight. Over there is Chimborazo (chĭm-bō-rä′zō), its snowy peak kissing the sky more than four miles above Guayaquil; and on each side of us, walling the valley, as far as our eyes can reach, are mountains, many of which are almost as high.

This wide valley extends from north to south throughout Ecuador. It has been called an avenue walled with volcanoes. Some of the many craters are active, and we can see the steam rising in clouds from them as we ride by. Earthquakes are frequent, and the houses are built to withstand them.

The high valley of Ecuador is where most of the people live. It is a rich farming region with crops similar to those of our northern states. We ride by fields of potatoes, barley, and wheat, passing orchards, gardens, and green pastures on which cattle are feeding. We go from one town to another until we come to Ambato (äm-bä′tō), a thriving little city in the heart of the Andes and a center of trade for east Ecuador. The town was destroyed more than two hundred years ago by the eruption of the volcano of Cotopaxi (kō-tō-păk′sē). The mountain is now smoking, and we tremble a little as we pass it on our way up the valley.

Ambato is a station on the railway from Guayaquil to Quito. We take the train here and ride all day through the high valley, stopping a while at Latacunga (lä-tä-kōōn′gä), between the volcanoes of Cotopaxi and Chimborazo, and arriving at Quito late in the evening.

We are now in the highest capital of the world, with the exception of Lassa, the capital of Thibet in the Himalaya Mountains. Quito is two thousand feet higher than the capital of Mexico and about seven hundred feet above Bogota. It is more than a thousand feet above the Saint

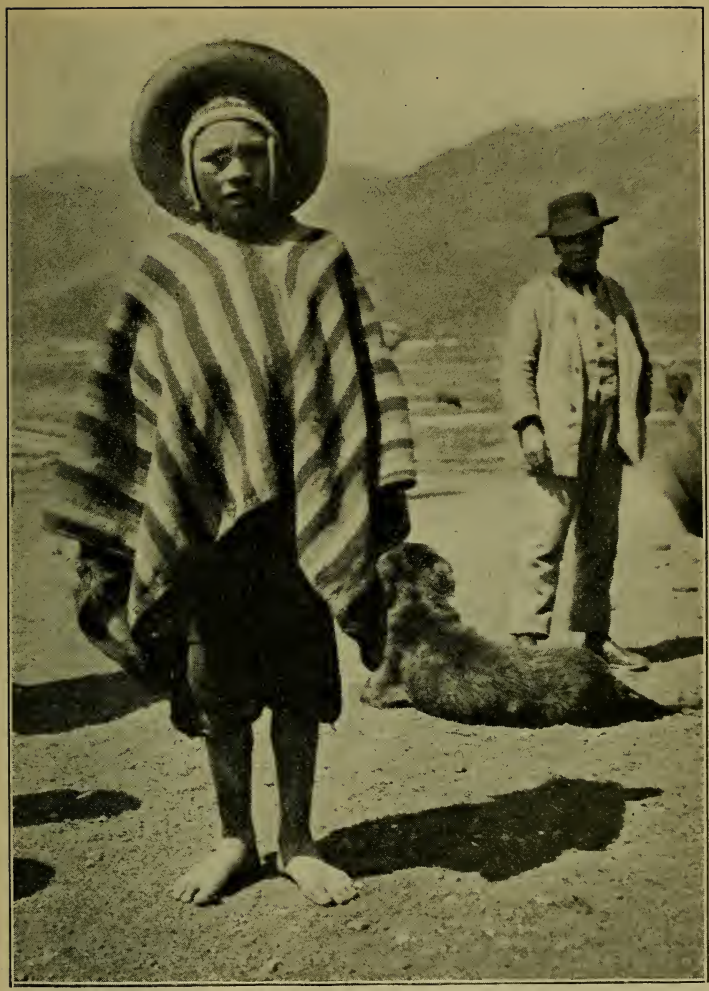
Indian water carriers in Quito. The jars are of burnt clay. The Roman Catholic church behind the fountain is one of many in the city. Quito has eleven monasteries and the largest convent of the world.

Bernard pass in the Alps Mountains, the highest point in Europe where men live through the year, and the place where the famous Saint Bernard dogs are kept to hunt for men lost in the snow. On Saint Bernard there is often ice all the year round. We find no ice at Quito. The air is as warm as May in our northern states, and the climate is perpetual spring. The city is almost on the equator, but the thin, clear air at that great height so tempers the heat of the sun that the people wear clothing as heavy as we wear in the fall. We find it cold morning and evening, and shiver in the unheated houses.

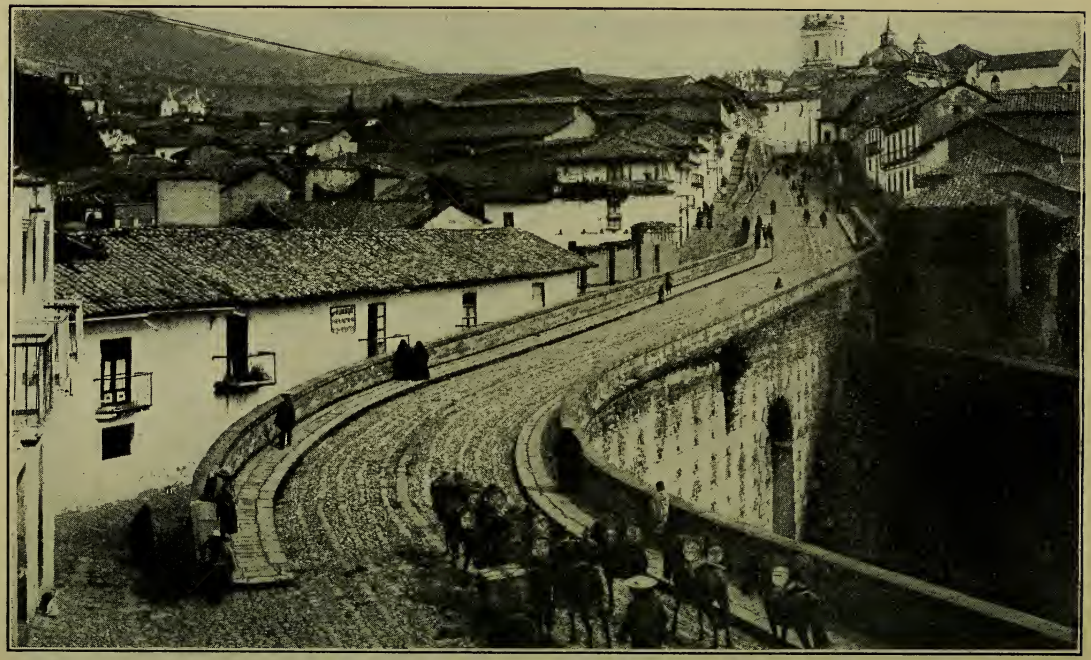
Indeed, Quito is more like a city of the temperate zones than any other on the equator. It has vegetables the same as ours, and we see pears, grapes, strawberries, and apples for sale in the markets. The roses bloom all the year round; lilies, pinks, and tulips may be had every month; while geraniums continually make bright the walls and roofs, and wild flowers cover the courtyards and ruins. How clear the sky is and how bright the sunshine! This is so throughout the day except for about two hours in the afternoon, when it rains.

Quito is not large, but it is about the most interesting city of all South America. The capital of the republic of Ecuador, it lies about one hundred and fourteen miles east of the Pacific Ocean in a bowl-shaped valley at the foot of the extinct volcano Pichincha (pē-chēn′chä), whose snowy peak we see far above us. Pichincha is higher than Mont Blanc, but we ride up to its crater on mules. From its summit we can see twenty snow-clad peaks ranging from three to four miles in height.

Quito is crossed from east to west by two deep ravines, through which Pichincha sends down its currents of melted snow. The streets run up hill and down, crossing one



The Indian boys of the Peruvian Andes wear heavy hats and ponchos. The knitted helmets and ear tabs are necessary on account of the cold of the high mountains. The wool of the poncho comes from the llama.



The city of Quito is traversed by deep ravines, one of which is crossed by a massive arch of masonry.

another at right angles or meeting at the plazas which are found here and there. The houses are of the Spanish style, built around courtyards, with roofs coming out over the sidewalks, and balconies in front of the windows. None of them is of more than two stories. They are made of stone or brick covered with stucco and roofed with red tiles. There are many churches and convents, and we see priests going about everywhere. They wear broad-brimmed black hats and are clad in black or white gowns.

The streets are filled with traffic. Long trains of donkeys and mules loaded with goods move back and forth through them, and we now and then see llamas with loads on their backs. There are many Indian men, women, and children carrying great burdens, some of them farmers who are bringing vegetables and fruit into the city for sale. There are well-to-do people dressed as we are, and hundreds of Indians wearing red or yellow ponchos, white cotton trousers, and broad-brimmed hats of white felt. The Indians come from different villages, and the cut of their hair, their hats, and their ponchos mark the locality where they live. Each tribe is said to have a style of its own. We are interested in the Indian boys who stare at us as we go by.

Ecuador has many Indians, and most of the whites have, we are told, more or less Indian blood in their veins. Over two thirds of the population belongs to the red race, and the majority of them are only half civilized. They have small farms, or work for the whites and the mixed race of Spaniards and Indians. These people were ruled by the Incas, of whom we shall learn more in Peru, and they had civilized ways when the Spaniards first came. They had covered this high valley with their villages and they

had many cities, one of the largest of which was old Quito, situated where we are now. Old Quito was a much larger city than the present capital of Ecuador. Its exact size is not known, but Atahualpa (ä-tä-hwäl'pä), the Inca monarch who lived here, had a palace roofed with gold, and there were many fine houses. When Pizarro, the Spanish conqueror, came he killed Atahualpa and enslaved his Indian subjects. He was followed by other Spaniards, some of whom intermarried with the Indians, and the descendants of those people are the ruling classes of Ecuador to-day.

These Indians form the working people of the country. They till the soil. They are the water carriers of the cities. They carry boxes of goods on their backs up and down the mountains and do all kinds of hard labor for very small pay. Many of them are practically slaves. They are not thrifty and get in debt to their masters, who can then force them to work until the debt is paid. Such debts often last from generation to generation. The Indians seem to have no ambition to better themselves. All one wants is a mud or stone hut, a suit or two of cotton clothes, a little rice and meat for food, and enough money to have a feast now and then.

In addition to these semi-civilized Indians of the Andes there are some from the eastern lowlands who are barbarous and others who are savages. In Quito we see many who have climbed up from the wilds bringing tropical fruits, rubber, and other things to the markets. There are Indians from the Napo River who sometimes use blowguns and poisoned arrows, and there are others who make blankets and skirts from the bark of trees. They show us this bark cloth and we buy pieces to take home. It is more like felt than cloth.

Among the Indians of Ecuador is a tribe of head hunters who have a practice of curing the heads of the enemies they kill. They cut off the head, remove the bones, and fill the skin with hot pebbles to dry it. As it shrinks they keep pressing it inward on all sides so carefully that it keeps its shape and has the same features as when in life, although it may be no bigger than a man's fist. The heads are then baked in the sand, after which they will last for years.

Formerly such heads were sometimes offered for sale to travelers, but the government has now forbidden the practice and any Indian caught with a dried human head is punished.

There is a university in Quito, and public schools of various kinds here and there throughout the country. We can usually tell where the schools are, for the pupils study out loud, making such a din they can be heard a long distance. We learn, however, that many of the children do not attend school, and that but few of the people can read. This condition will probably pass away. The government is introducing modern education, and the country is slowly improving in civilization, in commerce, and in wealth. It has now several railroads, including the one from Guayaquil up the Andes, and others are planned. We return from Quito to the seacoast by train, riding for two days through the high valley and down the slope of the Andes.

1. Trace our route from Colombia through Ecuador.

2. Where does Ecuador get its name? What countries adjoin it? What state of ours is nearest it in size? Compare it in size and population with Colombia, Peru, Chile. Describe its three regions according to climate. Why do most of the people live in the highlands?

3. Why is Guayaquil the best port? How far is it from Panama? From New York? Describe a walk through its streets.

4. Of what city of Italy does Bodegas remind us? How do the children go to school during the rainy season?

5. Describe our journey through the lowlands.

6. Why might Ecuador be called the "Button Country"? Follow an ivory nut from the tagua tree to its place on your clothing. Let the button tell the story. (See Carpenter's "How the World is Clothed," chapter 41.)

7. How are Panama hats made? (See Carpenter's "How the World is Clothed," chapter 30.) Mention other things we get from Ecuador. What does Ecuador buy of us?

8. Tell the story of your trip over the Andes. Compare the high plain of the Andes with our western highlands.

9. Locate Quito on the map. How far is it from Guayaquil? Visit the city and tell what you see. How high above the sea is your home? How many feet would it have to be lifted to be as high as Quito. Find out about the other high capitals of the world, Mexico City, Lassa, and Bogota. (See Carpenter's "North America" and "Asia.")

10. Tell what you know about a volcano — an earthquake. What famous volcano is in Europe? In North America? Compare Quito with Naples. (See Carpenter's "Europe" and "North America.")

11. Describe the semi-civilized Indians of the highlands and the savages of eastern Ecuador. Contrast both with our North American Indians.

X. IN THE GREAT SOUTH AMERICAN DESERT

WE have left Ecuador and steamed several hundred miles southward along the coast of Peru. The country is one fourth as large as the United States; but much of it is mountains and desert, and the eastern part, which slopes from the Andes to the Amazon valley, is wild and almost unexplored. There the population is scanty,

being composed chiefly of the savage Indians who live in the forest. The most thickly peopled sections are the highlands and the snow-water oases along the streams that flow from the Andes over the desert out to the ocean.

We are now in the midst of the South American desert which borders the Pacific Ocean, extending from Ecuador through Peru almost to Valparaiso (väl-pä-rä-ē′sō) in Chile. It is one of the great deserts of the world, and compares in

The Peruvian desert contains "marching dunes," or crescent-shaped ridges of sand.

some of its features with Sahara in Africa, Arabia and Gobi in Asia, and the wild wastes of central and western Australia. The desert begins at the sea and runs back into the foothills of the Andes, gradually rising. It is over two thousand miles long, reaching as far as from New York to Salt Lake City, and its average width is only about forty miles. Sailing by it, as far as one can see there is nothing but sand, sand, sand. On the east the thirsty foothills of the Andes rise and lose themselves in gray rocky mountains, which, piled one above another, end in perpetual snow. On the west are the sparkling waters of the Pacific, casting their silvery spray on the beach. The air is cool and dry, but the sand is so dazzling under the rays of the sun that we shield our eyes with smoked spectacles to keep out the glare.

In the lowlands of Ecuador the soil was black and moist, and the tropical vegetation so thick that we had to chop our way, a foot at a time, to get through. Here we can gallop on our horses for miles without seeing a tree, a flower, or a blade of grass.

Now we pass queerly shaped hills which seem to be moving on toward the north. They are the traveling sand dunes of Peru. They are all shaped like new moons, but they vary in size. Some are so small that they could be put into a schoolroom and others so large that they contain hundreds of tons of this moving sand.

But can a hill travel? Come to one of the sand mounds and see. The winds, which here blow almost always in the same direction, roll the little grains of the pile over one another, so that they move up the outside of the crescent and roll down on the inside, keeping the hill of the same shape, but slowly shoving it onward.

The traveling sand swallows everything in its way. It covers the bridle paths, which are the only roads of the

desert, and for this reason we dare not go without a guide, who directs our course by the stars at night and by the winds during the day.

Now we see a flock of vultures picking at the bones of animals which have perished of thirst in the desert, and perhaps the skull of a traveler who has been lost and has died here. Now and then we behold a condor, the biggest bird that flies, circling high in the air above us, making a moving shadow on the plain; but for most of the time there is nothing but sand and rock and sea.

Is it not a wonderful region? Yes; but it is easy to see that it cannot be otherwise when we think just where it is, and how it is affected by winds and the mountains, which we know have much to do with causing the rains.

The prevailing winds that sweep over this part of South America come from the east. Starting from the shores of Africa, as they cross the Atlantic Ocean, they fill with water so that when they reach the coast of Brazil they are loaded. As they go on over the land, they are cooled and drop a large part of the burden in the rains that feed the great rivers of eastern South America, and cover the land with tropical verdure.

They drop more and more water as they climb the eastern slopes of the Andes, so that when they have reached the top almost all of their moisture has disappeared, and what is left falls there as snow. The winds then sweep on down to the Pacific. They are now so dry that they have not a drop left for the coast. The result is this arid region upon which rain seldom falls.

And are there no oases in this mighty desert? Yes; here and there, at wide distances apart, are little rivers fed by the melting snows of the Andes. In the whole two thousand miles of sand there are about forty such streams,

and along them are the river oases, the only places in the desert where people live. It is in these oases that Lima (lē′mä), the capital of Peru, Callao (käl-yä′o̤), its chief port, and other principal cities are located, and here are some of the best farm lands of Peru. The soil of the desert is fertile, and if it can have water it will produce almost any kind of crops. We ride out of the sands into irrigated fields, and are surprised at the rich plantations of sugar cane, rice, tobacco, and cotton growing in these valley oases, with nothing but dry sand all about them.

We come upon vineyards in which delicious grapes hang from the vines, and we slake our thirst with the oranges we pick from the trees. There are no better fruit lands anywhere than the irrigated valleys of this sandy region. Bananas, oranges, limes, and lemons grow side by side with peaches and pears, and there are luscious cherries, plums, dates, and figs. There are watermelons and muskmelons, guavas and mangoes, and also papayas and alligator pears. The papaya is as large as a muskmelon and grows on a tree; the alligator pear, which is much smaller, comes from a tree of the laurel family. The papaya is sweet, and it aids in digestion; the alligator pear tastes like fresh butter and is eaten with salt. We find fruit for sale in every market. We can buy all we can eat for a very few cents.

The farms are divided into small fields fenced with thick walls of mud as high as one's waist, and are covered with a network of ditches to water the crops. In the north we go from the port of Paita (pī′tä) through the oases of the Piura (pyo͞o′rä) valley where there are irrigated fields of red or brown cotton. Here the plants bloom throughout the year, and we see many that have buds, blossoms, and bolls at the same time. The best of

the cotton is from plants only one or two years old, but if allowed to grow longer they become small trees and will produce some cotton for eight or ten years. Peruvian cotton brings the highest price in the market. It has long fibers somewhat like wool, and it is used by the manufacturers of hats, stockings, and underclothes to mix with wool to render the articles less liable to shrink. We import a great deal for that reason.

In the irrigated valleys farther south we see many sugar estates. They look much like our fields of Indian corn. The cane is planted in rows, and it comes up so luxuriantly that in the distance the fields seem a mass of beautiful green. Most of the plantations are large and well worked. Some of the richer farmers use gasoline tractors, gang plows, and harrows, and the cane is hauled to the mills upon little railroads.

The ordinary farming, however, is done in the rudest way. The fields are cultivated with oxen yoked by their horns to plows which do little more than scratch the ground as they are dragged over it. The large estates belong to the rich whites or people of the mixed race of Spaniards and Indians. The laborers are the Indians, or peons, as they are often called. They receive low wages but seem to be satisfied. They are ignorant and but few know how to read.

See that group in the field over there! They are as brown as our Indians and they have the same high cheek bones. They wear high broad-brimmed hats of dirty white straw, and the women and children are barefooted. The men wear leather sandals. The women have on short dresses with rebosas (rā-bō′säs) around their shoulders. The men wear bright-colored ponchos and wide white pantaloons which flap around their legs.

We shall see ponchos and rebosas nearly everywhere on the west coast of the continent. The poncho is a woolen blanket as large as a bedspread. It has a hole in the middle, and one sticks his head through the hole and allows the folds to come down over his shoulders. It looks picturesque and is both warm and comfortable. The rebosa is a long black shawl large enough to cover the shoulders and at the same time be wrapped around the head.

Let us enter the hut of a peon and see how he lives. The hut is of cane, and we can see out on all sides through the cracks in the walls. The floor is the ground, and the roof is of reeds, for it is needed only to keep out the sun, there being no danger of rain in the desert. The house has but one room and is not so large as many a room in our houses at home.

Where is the furniture? It seems as if the people had moved, for there is not much to be seen. There in the corner is a wooden platform as high as one's knee. That is the sleeping place for the father and mother. The children lie on the floor. There are no mattresses, blankets, or quilts. The peon wears at night the same clothing as during the day, the little ones huddling together to keep warm when the weather is cold.

Look at the opposite corner. See those two stones with the earthen pot on them. That is the cooking stove of the family. In preparing the meals a fire is placed under it, and thus the stew of goat's meat and rice, the most common dish, is cooked. The house has no other furniture and neither chimneys nor windows. This Indian has a few chickens and goats. You can see them feeding outside the hut. At night he will bring them indoors, and animals and family will sleep together.

We shall find such Indians all over Peru, although their houses and clothes are warmer in the cold mountains. They are of the same race as those we saw in the highlands of Ecuador. They were ruled by the Incas, and we can hardly realize that they once owned this whole country, and were more civilized in some ways than their descendants are now. The ruins of the ancient cities and villages are still to be seen, and there are many evidences that the Indians once farmed a vast territory which is now only desert and waste. They knew how to irrigate the soil. They even cultivated the hillsides of the Andes, and we shall see terraces high in the mountains that they built up with earth to raise crops.

These Indians were once a rich people, and their rulers really did have dishes of gold. It is said that the Spaniards took out of one of their temples as much gold as forty-two horses could haul at one time, and about twice that weight in silver. The silver nails of another temple weighed twenty-two thousand ounces, and silver was so plentiful that when the horses of the invaders needed new shoes they were shod with that precious white metal.

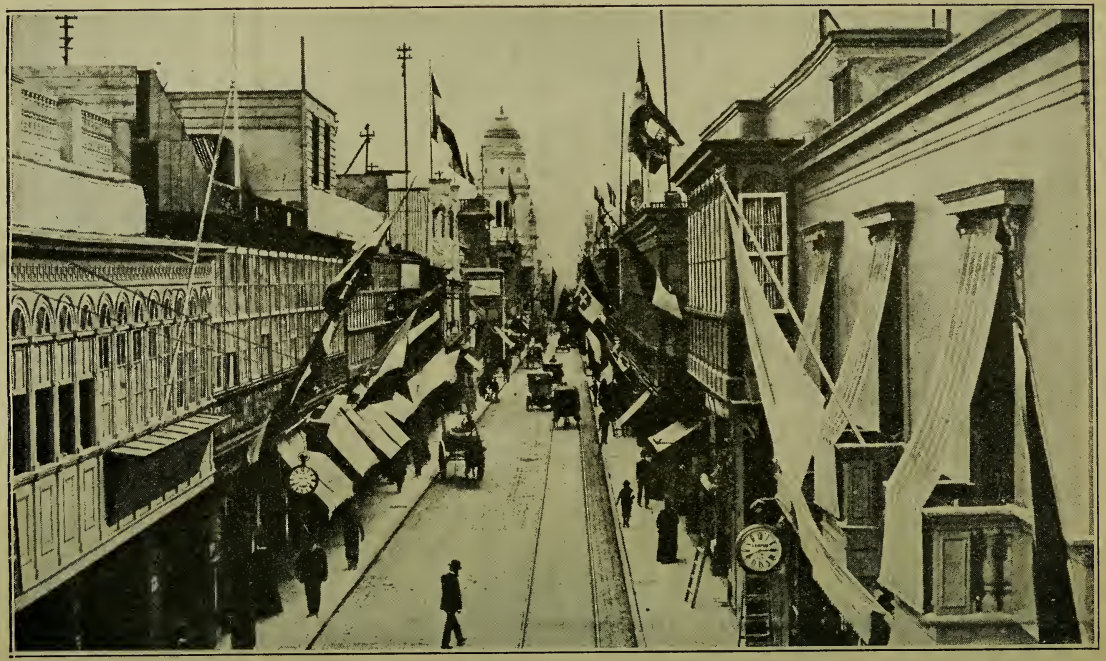
The leader of the Spaniards who invaded and conquered Peru was Pizarro. We can see his dried body in its glass coffin in the cathedral at Lima. About eight years after Balboa discovered the Pacific, Pizarro began to explore the west coast of South America, and after several years reached the Gulf of Guayaquil, and some years later entered Peru with his soldiers. He had only one hundred and two foot soldiers, sixty-two horsemen, and two small cannon, but with this force he met the Inca king, Atahualpa, and by treachery was able to conquer him. He asked the king to take supper with him in his fortress and then closed the gates and killed the Indian

attendants. The Indians were then without a leader, and they were so frightened by the horses and cannon, and so filled with fear that Pizarro would kill the king, that the Spaniards were able to defeat them. After that Pizarro kept Atahualpa in prison, but promised to release him if his subjects would fill with gold the room in which he was chained, from the floor to a mark on the wall as high as a man could reach. Atahualpa sent messengers out over the land to carry the promise to his people, and this vast amount of gold was brought in. Pizarro accepted the gold and then refused to carry out his agreement. He condemned the Inca king to death and had him strangled with a silk cord in sight of his people.

It was by such methods that the Spaniards became masters of all western South America. They treated the Indians with the greatest cruelty. They made slaves of them, forcing them to work in the mines. They used them so badly that many died, and to-day Peru, with both white people and the Indians, has not so many inhabitants as when the white men first came.

XI. IN LIMA, THE CAPITAL OF PERU

LIMA, the capital of Peru, is one of the oldest cities of our hemisphere. It was founded by Pizarro just one hundred years before Boston was started, and it is now a thriving city with electric street cars, electric lights, and all modern improvements. Let us climb to the roof of our hotel and take a bird's-eye view of the city before we begin to explore it. We are in a vast field of flat roofs, above which the massive towers of great churches rise here



A business street in Lima, one of the finest cities along the west coast.

and there. At the back are the bleak foothills of the Andes, gray and forbidding. There are white masses of clouds rushing over their sides, and the hills rise one above the other until they lose themselves in the dark clouds higher up. This morning the tops of the Andes are hidden. On bright days their snowy summits, glistening in the sunlight, shine like masses of silver high above Lima. We are here on the edge of the foothills, and that wireless telegraph tower is about one thousand feet above sea level. It can send messages to Panama and even across the continent to the coast of Brazil.

Turn your eyes again to the city. See that rushing stream flowing through it. That is the Rimac (rē-mäk′) River, fed by the melting snows of the Andes. It waters this beautiful valley that makes the oasis of Lima. Without it, all about would be desert. It irrigates the large plantations of sugar, cotton, and other crops that extend from here six miles to the coast where the river flows into the sea.

With a glass we can see the Pacific. That town on the coast is Callao where we landed. It is six miles from the capital and the chief seaport of Peru. That train going down through the green fields is carrying passengers and freight from Lima to the steamers.

What queer roofs are all about us! They are more like little gardens than the coverings of houses. Please step more lightly and do not stamp your feet as you walk. The roof is trembling under us, and with a little effort we could push our way through. The roof is made of bamboo poles with earth spread upon them. Were it not for the plaster beneath, the dust would sift through into the rooms. This is so with most of the houses about us, the smaller buildings being covered with canes upon which matting is spread, and upon that a layer of earth, sand, or ashes.

Is this not a strange way to build houses? You might think all would melt through if it were to rain. Yes, so it would, but we must not forget where we are. We are in the great desert of western South America, where from one year's end to the other rain seldom falls. There are probably not a dozen umbrellas in the city below us, and none of the people need waterproofs or rubber shoes.

Many of the houses of Lima are constructed of mud, because this is the cheapest of building materials. Notwithstanding, the city has a substantial appearance. The mud walls of some of the buildings look like marble and some are painted to imitate granite, while others, of bright colors, seem to be made of brick covered with plaster. They are in reality nothing but mud, being made of sun-dried brick. There are also large buildings of stone and burnt brick, roofed with red tiles, for the city is one of the finest along the west coast.

We are surprised at the extent of some of the houses. They cover a great deal of ground, but are usually of only one or two stories. In the two-story buildings the first story is made of sun-dried brick, the second being a combination of mud and bamboo canes.

From the roof we can see that each of the large buildings is in the form of a hollow square, with a little *patio* or court in the center. About the court the people sit at night, this being their favorite lounging place. Many of the windows open on the courts, but much of the light comes from the roofs. Little dormer windows are built up for this purpose from nearly every one of the houses. The dormers look like chicken coops, and, indeed, it is hard to tell which are the roof windows and which are the coops.

Yes, I mean coops which contain chickens. Don't you see them on the roofs all about us? Just over the way the

hens are putting their heads out through the slats, and just beyond a rooster is crowing. Thousands of chickens are raised on the houses of Lima. Chickens are hatched, grow up, lay eggs, and are finally killed for the kitchens below.

But let us go down and take a walk through the city. It is laid out in the form of a triangle. The streets cross one another at right angles, with beautiful parks or plazas cut out here and there. The business buildings have awnings over the sidewalks, and there are many balconies to protect us from the rays of the sun. It is but a few steps from our hotel to the chief plaza, on one side of which is the great Lima cathedral.

This building is one of the finest on the South American continent. It is older than any church in our country, and it has cost millions of dollars. We enter and take a look at the skeleton of the treacherous Pizarro in its coffin of glass, and then cross to the opposite side of the square where the government palace is situated. We enter the palace, call upon the president, and meet many of the officials, who tell us about the republic. The government is much like our own, consisting of a president and a congress elected by the people.

But it is now later in the afternoon and the offices will soon close for the day. It is also the best hour for shopping, and the time when the streets are filled with well-dressed people, some chatting together, and others going from store to store buying goods, so we leave the palace and stroll along with the crowd.

The business hours of South American cities are from seven in the morning until eleven, and from one until six in the afternoon. Between eleven and one most of the stores are closed. The merchants go to their breakfasts, for the people like to rest during the heat of the day.

Lima has many fine stores. Most of them are without windows facing the street. They are so made that the whole front can be opened, and as we walk along the streets we seem to be passing through a museum with goods of all kinds piled on the floors.

What queerly dressed women we meet everywhere! They look more like nuns than our mothers and sisters when out shopping at home. They are clad in black and have fine black cloths draped about their heads and pinned fast at the back of the neck, so that only the face shows. This is the costume ladies wear on the streets. The women of the upper classes dress much as we do when indoors, and are quite as fond of gay clothes.

The men wear clothes similar to ours. They have on tall hats and kid gloves, and nearly every one carries a cane. See how they lift their hats, smile, and shake hands when they meet, and how they smile and tip their hats when they part. The Peruvians are polite, and especially cordial to strangers. One of them will walk a block to show us our way, and if we admire anything he has he will ask us to accept it as a gift. Such offers, however, are merely a matter of form, and we must not accept them.

During a recent trip in South America, I was offered all sorts of things, from diamond rings to poodle dogs and fast horses. One day a rich Peruvian told me his palace was mine. I felt quite rich for a moment, but I knew he could not be in earnest and politely refused.

But let us leave the stores and walk through the city. The streets are so narrow that the carriages and automobiles have trouble in passing, and we are often crowded against the walls by the hucksters and milkwomen, who ride quite close to the sidewalk to keep out of the throng.

The hucksters carry their vegetables about in panniers slung upon donkeys, and the bread men ride horses or mules with bags of loaves on each side.

That woman coming toward us is a milkwoman. See how she bobs up and down as her pony trots onward. She has her cans in those leather buckets fastened to the sides of the pony, and she is sitting almost on top of the buckets, with her feet about the pony's neck. She is dressed in bright calico and wears a broad-brimmed Panama hat above her brown face. Now she stops and slides over the horse's neck to the street. She ties a rope around his front legs at the ankles to keep him from running away, and takes one of the buckets into a house. All the milk of Lima is thus served. The narrow streets are not suited to carts or large wagons, and the huckstering is done on donkeys or mules.

Next morning we go to the market, where we find dozens of animals loaded with all sorts of things. The big market house is thronged with cooks and other women buying supplies for their tables.

As we go by the stalls we see that the oases of the desert produce many good things to eat. There are string beans as long as your arm. They are tied in bunches and hung upon poles. We see potatoes of all kinds, some of which are as yellow as gold. They are the famous *papas amarillas*, the yellow potatoes of Peru. We see sweet potatoes of many varieties, and quantities of yucca, a rootlike tuber somewhat like the potato. It grows as big around as a baseball bat and is often two feet in length. The flesh is white and like wax or jelly.

There are roasting ears, squashes, and pumpkins, and many kinds of melons. The fruit dealers have oranges, lemons, alligator pears, guavas, papayas, pomegranates,

pineapples, bananas, peaches, pears, and grapes of many varieties. There are excellent fish, one species of which is served with lemon juice and eaten raw. There are all sorts of meats, and one can buy a kid or a half dozen guinea pigs for a trifle. The Peruvians are fond of guinea pigs, and raise them for food. We eat some of the meat in a stew and find it delicious.

XII. UP THE ANDES

GET out your overcoats, put on your high boots, and take your mittens along. We are bound for the top of the Andes, and may have to tramp through the snow.

We shall ride there upon one of the steepest railways of the world. The central railway of Peru begins at Callao, on the Pacific Ocean, and goes over the Andes and for some distance down the east slope, with a branch to the famous silver and copper mines of Cerro de Pasco (sēr′rō dā päs′kō), which are now owned by a United States company. The railway was planned and partly constructed by a Californian named Meiggs, but the cost was so great that the branch to Cerro de Pasco was not completed until a few years ago.

As it is, the road is several hundred miles long in its windings, although in a straight line it is only about one hundred miles to the top of the pass. It is so steep, however, that during that one hundred miles we shall rise more than three miles above the level of the sea, and land on the great plateau between the two ranges of the Andes.

Leaving Lima at seven o'clock in the morning, we pass through the sugar and cotton plantations of the Rimac

A railway in the Andes built by American engineers. The track zigzags back and forth to reach higher grades.

valley. The fields are as green as Georgia in June. The cotton is in blossom, and the plantations look like vast gardens of pink and light yellow roses. There are gangs of Indian peons, clad in white, working among them. The fields are as well kept as our gardens at home.

We ride by several villages of one-story houses, pass a cotton mill and a large sugar factory, and then shoot out into the dry foothills of the Andes. What a change! The vegetation has disappeared, and the low hills are bleak and bare in the light of the early morning. We ride for miles, climbing higher and higher, and seeing nothing but dazzling gray rocks.

Farther on there is more moisture, and a thin fuzz of green crops out of the gray. Now a little cactus and small bunches of weeds appear. As we rise higher still the mountains grow greener. At a mile above the sea there is a thin coat of grass, and at two miles we count forty different kinds of flowers at a stopping of the train. There are buttercups without number, and flowers of all colors, the names of which we do not know. It is now winter in the Andes, when halfway up the western slope there are frequent mists or light rains. In summer all is as gray and sterile as the desert below.

Now we have come to a region where patches of soil are to be seen here and there, and where every foot of good ground is tilled. The fields through which we are riding are not bigger than bedspreads, and those on the other side of the valley seem in the distance the size of a handkerchief. See those green ledges one above the other on the side of that mountain! They rise almost to the top and are so made that a man could stand on any of the lower ones and weed the crop on the ledge just above. Those terraces were built by the Indians in the time of the Incas. They are now used only for grazing.

We have stopped at a station. About it is a village of huts with walls of sun-dried brick and roofs of gray thatch. The stones have been laid upon the roof to keep the strong winds from lifting the thatch. How small the huts are and how mean! Some are no better than dog kennels. They are the homes of the dark-faced Indian men, women, and children dressed in white cotton, who are gathering about us as we stand on the platform. You may see more of them at work in the fields or tending the llamas, alpacas, and sheep in the mountains.

How pure the air is, and how grand the scenes all about us! The mountains rise almost straight over our heads. The railroad hangs to their sides, and we ride for miles between walls of rock which look like gigantic cathedrals, their spires lost in the clouds. We shoot through tunnels which wind about like the letter S, and cross steel bridges over deep cañons above mountain streams. Every turn brings new pictures, some of which are of terrible grandeur.

What a triumph of modern engineering was the building of this track up the Andes! It cost many millions of dollars and thousands of lives. The road goes up some of the steepest mountains of the globe. Much of its bed was cut out of the rocks, and at times the men had to be lowered in baskets over the precipices to drill holes for the blasting. The tracks wind this way and that, one above the other, so that in places we can count five different tracks which run almost parallel along the steep mountain wall, showing us how the road had to zigzag to climb its way up.

Farther on the air grows colder. At two miles we pass through a rainstorm, and later are surrounded by snow. Now the mist and clouds have come down about us, and we are enveloped in fog. A little higher, and we are above the clouds. Now the wind is carrying the clouds down

Amid the Andean glaciers. This photograph was taken 15,850 feet above the sea.

the Andes, the air becomes clear, and we shudder at the precipices, along the walls of which we are crawling.

Now we are surrounded by glaciers on the tops of the Andes. That white peak above us is Mount Meiggs. Its summit is more than seventeen thousand feet above the sea, and where we stop at the entrance to the Galera tunnel we are three miles farther up in the air than when we started this morning.

We are at the highest point on any railroad in the world, far above the height of Fujiyama, the sacred snow-capped mountain of Japan. We are about as high up as Mont Blanc, and a thousand feet higher than Pikes Peak or any other mountain in the United States outside Alaska. There is a blue glacier hanging over us at the top of Mount Meiggs, and right under it, in the middle of the tunnel, is a place where the waters flowing to the Atlantic and to the Pacific divide. We go in and take a drink from the stream at the side of the railroad, which is trickling its way to the Rimac River and the Pacific, and then by a jump reach a place where we bend over and scoop up some water about starting down the east slope into one of the tributaries of the Amazon on its way to the Atlantic.

We walk farther on through the tunnel to the eastern side of the Andes. There are snow banks outside the tunnel and we start a snow fight away up here in the clouds. We are soon glad to stop. The air is so rare that every ball we throw sends our hearts into our throats, and we pant for breath. We try to yell, but our voices are weak from the thinness of the air, and the yell ends in a squeak. Our boots suddenly grow heavy. We move slowly, and in climbing the hills we crawl. Some of us are attacked with the *soroche* (sō-rō′chā) or mountain sickness that comes to many when they first go so high

in the air. We have terrible headaches, and at the same time feel severe nausea. During our first night in the mountains we cannot sleep. Some of us faint, and blood comes from our mouths, eyes, and noses. The sickness passes away after a while, however, and we then enjoy the strange sights and pure air of the Andes.

XIII. ON THE ROOF OF SOUTH AMERICA

WE are starting this morning for a journey upon the high plateaus of the Andes. The cold air bites our noses. There are snowy mountains on each side of us, and we are on what might be called the roof of the South American continent. The Andes are among the highest mountains of the globe, and they are surpassed only by the Himalayas of Asia. They have several peaks more than four miles above the sea. We saw some of the loftiest in Ecuador, and we shall travel among others on our way south through Peru and Bolivia.

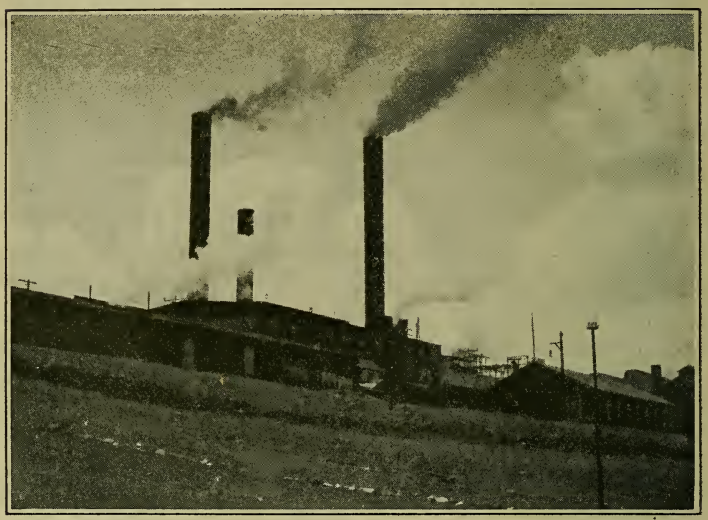
The highest of the Andes is Mount Aconcagua in Argentina. Its top is about twenty-three thousand feet above the sea level. Beginning with it and running northward to Ecuador, the mountains extend in an irregular double chain, upholding this lofty plateau where we are now. The plateau in some parts of Peru is five hundred miles wide, and in Bolivia it is bigger than the state of Missouri. Much of it is more than twice as high as the top of Mount Washington.

We are many days riding on horseback upon the plateau, and now and then we make excursions off to the camps where men are mining for silver and gold. The Andes are

noted for their mineral deposits, and great quantities of the precious metals, as well as copper and tin, are taken out of them and shipped to the United States and Europe every year. Some of the best mines of Peru belong to United States citizens, and among them are the copper and silver mines of Cerro de Pasco, reached by the central railway up which we have come. Cerro de Pasco is on a branch line ninety miles north of the road over the Andes. It is built above what was one of the largest bodies of silver ore ever known. It was about a mile long and more than half a mile wide. The mine was discovered several hundred years ago by an Indian shepherd who had wandered there one day with his flock. As evening drew on he found the air cold and kindled a fire before which he lay down to sleep. When he awoke next morning he discovered that the stone upon which his fire had been built had melted and turned to silver. Since then millions of tons of silver ore have been taken out of mines below where that shepherd lay, and now great quantities of copper are being mined from where it was found under the silver. The copper mines are owned by men from the United States who have built a huge smelter near Cerro de Pasco. It is over fourteen thousand feet above the sea and is the highest smelter on earth. From it come many thousands of pounds of copper a day. The red metal is shipped over the railroad to the seacoast, and thence sent north through the Panama Canal to the United States. It may be that the telephone wires in our home towns are made of that copper.

Another important mineral found in Peru is vanadium, which is mixed with steel to increase its strength and resistance to shock. It is used largely for airplanes, armor-plate, and automobiles. It is also employed in machine tools which will run at high speed and not be

affected by heat. Peru produces most of the vanadium of the world, and its mines are worked by United States citizens. They are not far from Cerro de Pasco. They are more than three miles above sea level, near the famous Rock Forest of the Andes, a region somewhat like our Garden of the Gods in Colorado.



This copper smelter near Cerro de Pasco, 14,000 feet above the sea, belongs to citizens of the United States.

Vanadium looks somewhat like black asphalt. It is dug out of the earth and carried on the backs of llamas to the railroad; thence shipped to the seacoast, from where it is exported to steel centers all over the world. During the World War much of this metal was used in making machine guns and other things for the armies of the United States and our allies.

Petroleum has been found in the highlands, and large pools of it are being worked along the coast of the Peruvian desert.

Traveling southward upon the high plateau of the Andes, we ride on and on over desolate plains covered with a scanty growth of fuzzy green grass. How it rains! It is now winter and we have a storm of hail, snow, or rain almost every day. The grass is soaked with water, and we cannot get down from our horses without wetting our feet.

There are but few trees, and the little mud huts have only small patches of potatoes, green barley, or quinua (keen'wä) about them.

This plateau is the natural home of the potato, which was first taken to Europe about seventy years after Columbus discovered America. Later on it was cultivated in Ireland to such an extent that it is often called the Irish potato. The potatoes of Peru are small, many of them being no bigger than walnuts. It takes a milder climate and a rich soil to make them grow to the size of the huge tubers sold in our markets. The potatoes of Montana and Colorado would be giants in this land from which their forefathers came.

We are now so far above the sea that barley will not ripen, although some is grown for forage. Quinua, which takes the place of many other grains in these highlands, is a plant much like our chickweed. It has yellow or red leaves and little white seeds which when shelled out are like hominy ground fine. It is eaten as mush and is cooked in stews.

There are dandelions and other hardy flowers on the plains. There are evergreen bushes that grow only as tall as our ankles, for all things are stunted here so high in the air.

Llamas are queer little members of the camel family, used as beasts of burden in the Andean highlands. This train is carrying silver ore from a mine to the smelter.

What are those queer animals we see in the pastures or going along with bags on their backs? They are bigger than sheep, but they remind us of them, for they are covered with wool. They have long necks, with heads like a camel's. Their feet and legs are like those of a deer. See how gracefully they walk. Notice how they hold their little heads in the air, pricking up their ears like so many Skye terriers. Those are llamas, the odd little creatures which act as beasts of burden in the Andean highland.

Are they not beautiful? Some are snow white, some seal brown, and a few black and spotted. Their wool is long. It is used by the Indians to make ponchos, blankets, and clothes.

Let us examine the llamas more closely. Take this drove coming toward us, each carrying a bag of silver ore on his back. Notice how small the bags are. Each weighs just one hundred pounds. The llama is particular as to how much he carries, and that is the biggest weight he will stand. If you put on more, he will not cry or groan but will calmly kneel down and stay there until his load is made right.

Look out! Don't stroke that beast with your hand! Don't you see he is angry by the way he is shaking his head?

And do llamas bite?

They do not bite, but when angry they spit, and I would rather have three camels bite me than be spat upon by one of these beasts. Their spittle has an offensive smell, and it smarts like an acid. If once hit, you will find it hard to get the stench out of your clothes, and you cannot go on with our party until you have had a bath and a change. We find some of the llamas gentle, however, and we grow to like them as we ride farther on the high plains.

Cuzco, the city of the Incas, was once the capital of the greatest native empire in America. It now has about 20,000 people.

But are these baby llamas on the pastures through which we are passing? Some of them are black and some are snow white. No, those are not llamas, although they look like them. They are alpacas, a domestic animal not used as a beast of burden but valued for its long, silky wool. The wool is finer than that of the llama and it is straighter and stronger than sheep's wool. It makes shawls, fine clothes, and umbrella covers. Much of it goes from Peru to our country.

The vicuña (vē-cōōn′yä), a still smaller animal belonging to the same family, runs wild in these regions. We may have a chance to shoot one later. It is as swift as a deer and exceedingly wary. Vicuña wool is like yellow velvet, and we can buy rugs made of the skins in the stores of the Bolivian cities. Still farther south we shall see the guanaco, which also looks like the llama but is as wild as the vicuña. It has yellow and white fur about as long as that of a Newfoundland dog.

Going on with our journey, we now and then cross the high valleys that cut through the Andean plateau. In these valleys, owing to the lower altitude, the climate is milder, and there are all kinds of semi-tropical fruits. In one of these valleys we visit Cuzco (kōōs′kō), where the capital of the Incas, the rulers of the Indians of ancient Peru, was located. The town is situated one thousand feet below the level of the plateau at a place where three rivers meet. Nevertheless, it is more than two miles above the sea.

We see here the ruins of the great temples that the Spaniards found in the days of Pizarro. Cuzco was then the chief city of the great nation of civilized Indians who inhabited almost the whole of western South America. These Indians might be compared with the Aztecs of

Mexico, and Cuzco with their capital, situated where Mexico City now is. Cuzco had about two hundred thousand people, and some of its temples were plated with gold. The Spaniards tore seven hundred gold plates, each as big as the lid of a large chest, from the walls of the Temple of the Sun, and when they left after their first visit their horses were loaded with gold. A part of the walls of this temple and others built then are still standing. They are made of huge blocks of stone fitted together without mortar so tightly that when I tried to push a needle between the stones it would not go in. The ruins of the great fort of the Incas above the city are still to be seen, and near by we are shown a seat cut out of the rock that served as the out-of-door throne of the Inca king.

Pizarro found the plateau quite thickly populated. It is still so to-day. Although it is more like a city of old Spain than like the capital of Atahualpa, Cuzco has now about twenty thousand inhabitants, who live in stone buildings of one or two stories. They are covered with plaster and have roofs of red tiles. Churches and convents have been built on the ruins of the Inca city, and there is a cathedral that covers several acres.

We are surprised to see so many Indians in Cuzco. The town has twelve red men to every white one, and on our way down the Andean plateau we meet many queer-looking Indian men, women, and children. They are in their bare feet, and they wear an odd dress. The men have on bright-colored ponchos, black vests, and wide black trousers slit up as far as the knee at the back. Each wears a woolen cap, knit much like a nightcap, with flaps down over the ears. Over the cap he has a low felt hat with a very broad brim, which seems to be more for ornament than warmth. The Indian women wear black or blue

woolen skirts that reach just below the knees. They have hats with low crowns and broad brims. We see many of them in the fields, watching the llamas, alpacas, and sheep. Each has a long spool of wool in her hand, and she spins llama wool as she watches her flock.

The Incas built walls of enormous stones without mortar, but so nicely fitted that the author cannot thrust a needle between them.

We meet more Indians as we go on toward Lake Titicaca (tē-tē-kä′kä), and we shall see their mud villages everywhere on the high plateau of Bolivia. They belong to the two tribes, the Quichua (kē′-chwä) and Aymara (ī-mä-rä′), both of which were here when the Spaniards first came. The Quichuas occupied Peru and the lands to the north. The Aymaras lived in the plateau farther south. Even now the descendants of these two tribes number more than one million.

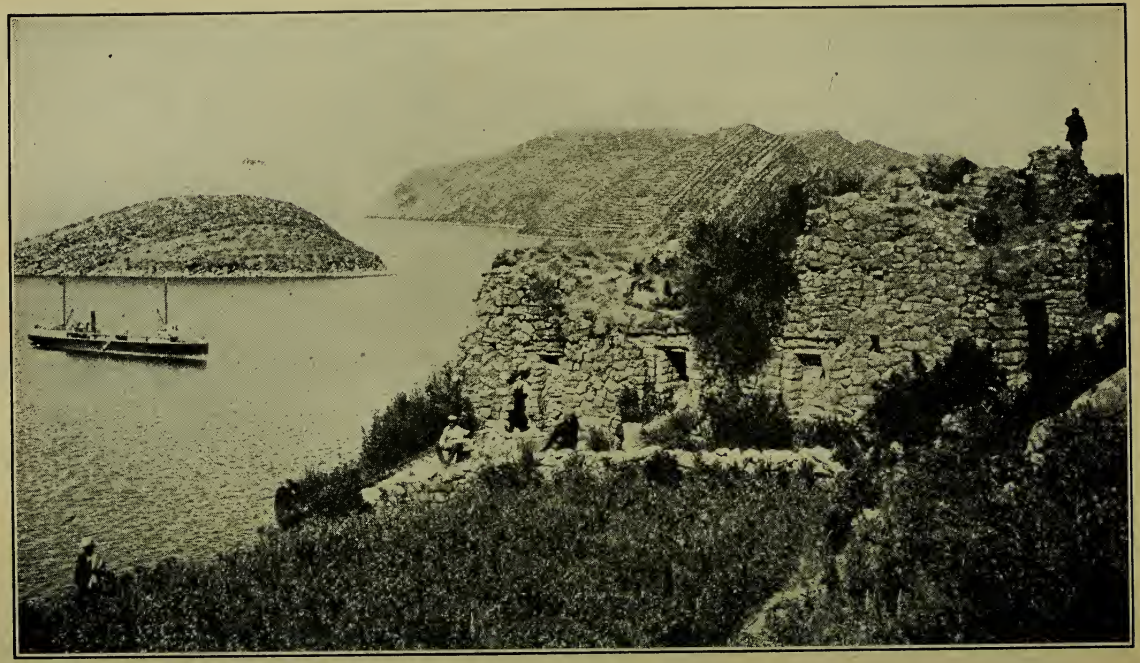
These Indians of the high Andes are a queer people, and

The dress of the Andean Indians varies in style. Among the six the only footgear is one pair of leather sandals. Observe how the girl at the front carries the baby.

they have habits and ways of their own. Most of them are descendants of the tribes who were ruled by the Incas. Like those we saw in the high valleys of Ecuador, most of them are little more than slaves to the white and mixed races who own the lands. Each large farm has a small colony of Indians upon it, and each family has its mud hut. Throughout the year the Indians work one half of each week for the owner of the estate as rent for their huts and the small patches of ground about them. The remaining three days they have for themselves. If their master does not want their work he can hire them to others, and if they do not obey he can punish them.

The Indians are docile and will bear much without growing angry. They are said to love their masters and will band together to fight for them. The Indians of the different farms often have quarrels, and at such times each band marches upon the other as though in actual warfare. They frequently use guns, but more often slings, with which they throw stones with great force and skill, sometimes killing one another in their fights.

Let us enter an Indian hut. The one we select would hardly be a respectable pigsty for one of our farms. It is of mud, and is not more than ten feet square. Its thatched roof is so low that we can touch it when we stand outside the front door, and as we go in we have to stoop and lift our feet as high as a chair to get over the mud sill and through the hole which serves as an entrance. Inside there is only just enough space to turn around. One side of the room is filled with farm tools; on the other is a donkey, and the chickens squawk as they run here and there to get out of our way. There is almost no furniture. The people sit on the floor. They often sleep sitting against the wall, huddling close together for warmth.



Extensive ruins on Lake Titicaca bear witness to the power and importance of the Inca civilization.

That little clay pot over there with the ashes beneath it is the stove. The hut has no chimney, and the smoke finds its way out as it can. The cooking is simple. A favorite dish is challona stew with chuño (choon'yō), or frozen potatoes, mixed with it. Challona is dried mutton. The sheep is split open when killed and then left out to freeze. When it is stiff water is sprinkled over it and it is frozen again. It is then hung up out-of-doors and soon becomes so dry that it will keep for months. It must, however, be cut up into small bits and boiled a long time before it is tender.

We find chuño for sale in the markets of Cuzco, and we can buy them everywhere on the high plateau of the Andes. They look like bits of bleached bones, or perhaps more like the large flat white pebbles one finds on the seashore. They are really potatoes which are frozen and dried, so that they can be kept for a year without spoiling. The raw potatoes are first soaked in water, being wet every day, and left out at night to freeze. The skins are then trodden off with the bare feet, and the potatoes are thoroughly dried in the air. They are now as hard as rock and as white as snow. They are soaked before cooking, and are usually served as a stew. We eat some, but find them insipid.

XIV. STEAMBOATING ABOVE THE CLOUDS

STEAMBOATING above the clouds! Floating over some of the highest waters of the globe! Sailing in sight of glacial snows amid the tops of the Andes, so near the sky that heaven and earth seem to meet close around us and make us think we are on the very roof of the world!

We are outside the harbor of Puno (pōō′nō) on the broad waters of Lake Titicaca.

The air is so clear we can see for miles. That blue mass in front is Titicaca Island. It will take us four hours to steam to it, but it looks quite near as it lies there like a great balloon on the water. There are altogether eight large islands in the lake, some of which are inhabited. Now we are steaming by one. See, the bits of land between the rocks are green with scanty crops of potatoes, barley, and quinua. The soil is cultivated to the tops of the hills, and red-faced Indians are at work in the fields. Their huts of stone and thatch are near the shore. Some have llamas, sheep, and donkeys tethered about them.

How grand are the mountains! There is nothing finer in the Himalayas or the Alps. That silvery mass at the east is Sorata (sō-rä′tä), next to Aconcagua the highest of the Andes. The great wall of mountains which stretches from it to the east is the Sorata range, and that tall peak rising over the others is Illimani (ēl-yē-mä′nē), which is about four miles in height.

This lake upon which we are floating is almost as high in the air as Pikes Peak. Those little huts we see on the islands are among the highest houses in the world in which people live, and this is really the loftiest of all lakes upon which steamboats sail. Nevertheless, it is half as large as Lake Ontario, and of about the same depth.

But where does the lake come from, and where does it go? We can easily see its source in the snows and glaciers about us. It is made by the snow water of nine rivers from these mighty Andes. It remains at about the same level from one year's end to the other. A part of its waters flows into the river Desaguadero (dās-ä-gwä-dā′rō) and on into Lake Poopo (pō-o̱-pō′) which has no outlet to the sea.

But let us take a look at our ship. It is as beautiful as a gentleman's yacht, and it is carrying us over Lake Titicaca at a speed of twelve miles an hour. It is named the *Choya*, and a plate on its engine records that the ship was built away off in Glasgow, Scotland.

This seems strange. How could they possibly lift such a big ship over the Andes? The *Choya* weighs so much that if it could be loaded on wagons a thousand horses could not pull it. They could not lift such a weight over these mountains, which are twice as high as any peak of our Appalachian chain.

Of course they could not if they tried to lift the ship as a whole. But such a vessel was needed for commerce, and commerce works in all sorts of ways to accomplish its ends. The ship was taken apart and the pieces put on a steamer and brought from Glasgow over the Atlantic and Pacific oceans to the seaport of Mollendo (mōl-yĕn′dō) in southern Peru. At Mollendo is the beginning of a railroad quite as wonderful as that upon which we came over the Andes from Lima. It is three hundred miles long and connects the seacoast with Puno on Lake Titicaca, the port to which we came by railway from Cuzco. The parts of the ship were put on the cars at Mollendo, and the locomotives dragged them up over the Andes to Puno. Here they were taken off, put together, and launched on the lake; so that to-day we can sail upon these high waters in a steel vessel made in Scotland. This is one of the wonders of commerce.

We are still more interested when the engineer tells us the coal he is using comes from Australia, so that both sides of the world seem to be working to help us along on our journey.

When we examine the freight on the *Choya* we see how

the ship is one of the agents of commerce. It contains goods from the United States and other parts of the world, which it is carrying to Bolivia; and the captain tells us that it will bring back a load of copper, gold, silver, tin, and Peruvian bark and rubber to be sent down to the Pacific. Who knows but that the copper may be used in the same works in Glasgow where the steamer was made; and whether the silver and gold may not find their way to Australia to pay the miners who have furnished our coal?

Now we are approaching Guaqui (gwä′kē), the only port of Bolivia. We see many boats near the shore and some starting out to bring freight to the steamer. What queer things they are! They appear to be made of straw, but men are working upon them, and one has a donkey and a llama on board. Some have sails made of rolls of straw or reeds tied together. Others are being poled through the water. They are balsas, a curious craft used by the Indians of Lake Titicaca. They are just like the boats which they had when the Spaniards first came.

Here is a balsa which has come close to our steamer. It is made of the long reeds that grow in quantities on the edge of the lake. The reeds are laid side by side and tied tightly in rolls which are so woven and fastened that they form a water-tight boat which will float on the lake.

But we have at last reached the wharf. There is a crowd of Indians ready to unload the steamer. We hand our baggage to them and follow them to the town. As we go we pass hundreds of mules and llamas loaded with produce to be shipped across Lake Titicaca. Other goods are coming in by the railroad from La Paz (lä päs′). They will be sent over the lake to Puno and will go down the western slope of the Andes to Mollendo, the chief port of southern

A balsa is a large boat, woven out of reeds like a basket.

Peru, from which steamers will carry them northward through the Panama Canal to Europe and the United States. This railway is one of the chief outlets for the tin trade of Bolivia.

1. Locate Peru. Compare it in size with the United States; with your state; with Brazil; with Ecuador. (See Table V.) What is the government of Peru?

2. Describe the South American desert. Why are the coast lands of Ecuador wet and this coastal desert so dry? What kind of oases has Peru? Why do the people live in the oases? Mention some of the important fruits and crops. Why do we import Peruvian cotton?

3. Name three others of the great deserts of the world. (See Carpenter's "Asia," "Africa," and "Australia.") Mention some famous oasis cities. Compare Lima with Cairo in Egypt; with Damascus in Asia.

4. Write a letter from an Indian boy of Peru telling how he lives and works in the desert.

5. Tell the story of Pizarro and the Incas. Who were the Quichuas? Describe Indian life on the plateau. Contrast our treatment of the Indians with that of the Spaniards. Describe Cuzco as it is to-day. What North American Indians resembled the Incas?

6. Trace our trip through Peru. What is the chief port? How far is it from Panama, New Orleans, and New York? Write a story of our walk about Lima. Why are many of the houses made of mud and bamboo? Mention some of the things to be seen in the markets. Compare Lima in size with the other South American capital cities.

7. Tell about the mines of Cerro de Pasco which are owned by North Americans. What important metals come from them?

8. What is vanadium? Where is the chief source of supply? Why was vanadium necessary in the World War? Trace a shipment from near Cuzco to Pittsburgh.

9. Describe a railroad trip up the Andes. How does the altitude affect us? What is soroche?

10. What grains and vegetables do we see upon the plateau? Where were potatoes first grown? What other grains or vegetables came from America? What is chuño?

11. Compare Lake Titicaca with one of our Great Lakes. What is its outlet? What products are shipped across this lake to be taken to the United States? Describe our steamer and the native boats.

12. What are llamas? Alpacas? Vicuñas? What other animals have wool fit for cloth? (See Carpenter's "How the World is Clothed.")

XV. TRAVELS IN BOLIVIA

WE are in Bolivia this morning, and we should feel at home. The country was named for Simon Bolivar, and its constitution is modeled after ours. Bolivar is often called the George Washington of South America. He was born in Caracas (kä-rä′käs), Venezuela, at about the close of our Revolutionary War. He visited the United States, and during that time was so impressed with our government that he went back to South America and started the revolution which spread from country to country and finally made it a land of republics.

Bolivia is situated many miles from the Pacific Ocean and is cut off from the seacoast by Peru and Chile. With the exception of Paraguay, it is the only country in South

America that does not have direct access to the ocean. It has three railways, however, which connect it with the Pacific. One goes to the port of Mollendo in Peru; another to Arica (ä-rē′kä) in Chile; and a third to Antofagasta (än-tō̆-fä-gäs′tä) in Chile. Through each of these ports Bolivia has considerable commerce with our country and Europe by way of the Panama Canal. The eastern parts of the country, consisting of the rich tropical plains sloping down the opposite side of the Andes, have access to the Atlantic Ocean through some of the tributaries of the Amazon and Paraná (pä-rä-nä′) rivers. Rubber and other products, for instance, are sent down the Beni (bā-nē′) River to the Madeira, where they are carried by railroad around the great falls and then transferred to steamers which take them to the Amazon and the Atlantic Ocean. Other goods go down the Pilcomayo (pēl-kō̆-mä′yō) River into the Paraguay; thence to the Paraná and via Buenos Aires (bwā′nōs ī′rās) out to the sea.

It is hard to realize that this inland republic is about one sixth as large as the United States without Alaska. The country may be divided into two sections. Western Bolivia, whose chief city is La Paz, is a tableland as big as Missouri, much of which is more than two and one half miles above sea level. It is one of the highlands of the Andes, and is looked down upon by some of the highest of these mountains. It is a dry, thirsty country, and in many respects is like the high plains east of the Rocky Mountains. Eastern Bolivia, whose chief city is Santa Cruz (săn′tä krōōz′), is equal to ten states the size of South Carolina. It is on the eastern slope of the Andes, and much of it is covered with vegetation which includes all the plants and trees of the tropics.

The climate of the country differs according to the

altitude of the various regions. The low eastern plains are hot and unhealthful. A little higher the climate is temperate, and on the Andean plateaus and high valleys the weather is so pleasant that the region is often called the "Switzerland of America." These highlands comprise only about three tenths of the total area of the country, but they contain more than eight tenths of the people. Here are all the large cities, most of which are located more than two miles above the sea. There are four towns which are about as high up in the air as Pikes Peak, and twenty-five which are higher than the top of Fujiyama in Japan. The altitude of Aullagas (oul-lä'gäs) is almost as high as Mont Blanc.

Eastern Bolivia is a land of cattle, cacao, and rubber. It has dense forests and rich grassy plains, but it is largely unsettled and much of it still unexplored. The mountains and plateaus of the west are where most of the people live. They contain vast deposits of gold, silver, copper, and tin. Bolivia produces much of the tin used in the United States, and next to Malaysia has the largest tin mines of the world.

Bolivia has a small population for such a vast area. The whole country has about as many people as Chicago; and its chief city, La Paz, has only about one hundred thousand. Sucre (sōō'krā), the old capital, has about thirty thousand, and Cochabamba, situated in a beautiful valley, is a little larger. The mining towns of Potosi (pō-tō-sē') and Oruro (ō-rōō'rō) are of about the same size. Santa Cruz in eastern Bolivia is smaller.

The people are whites and of the mixed race of whites and Indians, with many semi-civilized Indians upon the plateaus and savages of various tribes in the wilds of the east. The Indians of the plateau are Aymaras, tribes

Aymara Indians of Bolivia. Their ancestors were subjects of the Inca Empire.

much like the Quichuas of Peru. They were conquered by the Incas, whose soldiers were Quichuas. The people of the mixed race are called Cholos (chō′lōs), and their little children are known as Cholitos (chō-lē′tōs).

La Paz lies only about fifty miles from Lake Titicaca, where we are now. The train is ready, but we want to see the country, and so take a carriage drawn by eight mules. The Indian driver has a pile of stones in the seat beside him, and he keeps his team on the gallop by now and then throwing a pebble at the ears of such of the animals as are lagging behind.

The ride is delightful. We are on the high plateau. The air is bracing and so clear we can see for miles. To the east is a great wall of snow-clad mountains, with Illimani rising above the rest of the peaks, and away off to the west are lower heights which seem to climb over one another and end in snow at the sky. Now we pass a mud hut, and now a flock of llamas, alpacas, or sheep feeding on the thin grass. But other than these there is nothing about us but the sky, the plains, and the mountains.

As we near the close of the day we look for the city to which we are going. There is nothing in sight. We are hungry, and wonder whether we shall get there before dark, when at last the driver pulls up the mules on their haunches and the stage stops. We are on the brink of a precipice; a thousand feet below us in a little gorge in the mountains is La Paz.

It is so far down that we can hardly distinguish the houses. They look like a jumble of gay-colored boxes with trees rising here and there above their red roofs. They grow plainer as we gallop on our winding way down the steep slopes of the hill. We are soon riding between walled gardens, and at last the stage stops in the heart of the city.

How queer it all is! Most of the people about us are clad in the brightest of reds, blues, and greens. Every other man wears a poncho, or blanket, with his head through a hole in its center, and some of the women have striped shawls, short skirts of bright hues, and queerly shaped hats. Five eighths of the population are Indians, and the remainder are whites or of the mixed race of Indians and whites called Cholos.

Even the houses are a blaze of color, and the walls facing the streets are of various hues. There is a lavender grocery store; next to it a shoe shop of rose pink; and farther on are other establishments of cream and sky blue. The buildings are of one or two stories. The shops are open to the street and we can see all that goes on within.

But where can we get a cab or dray to carry our baggage to the hotel? There is none in sight, and we learn that there are few in La Paz. The streets are so narrow and so up hill and down that such vehicles are not much used in the city, and all freighting is done by donkeys, ponies, llamas, and men. There are a dozen Indian porters around the stage office, and we give each man a trunk. He trots off to the hotel with it on his back, and we walk behind.

Next morning we start out for a tour of the city, going up the hills slowly, for the air is so thin that we are soon out of breath. La Paz is twice as high above the sea as Mount Washington, and only the natives can walk fast or run at this altitude.

We visit the markets. It is early morning but the streets are filled with Indians, Cholos, and whites, dressed in all colors of the rainbow. There are scores of country women carrying fruit and vegetables to the markets for sale. Their burdens are tied in striped blankets of blue, red, yellow, and green, and they bend half double as they

La Paz, the seat of the Bolivian government, lies at the bottom of a mountain valley, 1000 feet deep, with the volcano of Illimani towering over it. The city is more than 12,000 feet above the sea.

Market scene in a Bolivian village. The people are Aymara Indians. The peddlers sit on the ground.

walk onward. They sit down on the streets and spread their wares out before them, peddling them by the piece or the pile.

There are Indian men wearing gay ponchos, and so many copper-skinned babies that we have to pick our way carefully to keep from treading upon them. Some lie on the cold stones and play with the merchandise scattered about. Others are too young to crawl; their big black eyes peep out of the shawls in which they are tied to the backs of their mothers. Most of the babies are laughing. There is one crying, and over there is another who has crawled away from its mamma and is almost under the feet of those llamas coming up the street. Now its mother sees it and grabs it away.

Stop and look at the queer things for sale all around us. What funny potatoes! Those in that pile near us are no bigger than chestnuts; they are as pink as the toes of the baby who is playing among them. Here are some of a violet color, while those in the next pile are as black as my boots. The white ones are chuño, and have been frozen for sale.

See the great variety of fruits. We find quinces, peaches, and pears on every corner, as well as oranges, lemons, and pineapples. The latter fruits come from the lowlands, for it is only a few days' ride on muleback from La Paz to the tropical valleys found here and there in the Andes. The various depressions give all sorts of climates and all kinds of fruits.

Eastern Bolivia is naturally one of the richest lands of the world. Below the plateau and over the range at the east are great plains upon which vast herds of cattle and sheep are pastured. Lower still are forests of about forty million acres in which rubber trees grow, and as much as

ten million pounds of rubber has been gathered there in one year. The rubber is shipped down the Beni and Madeira rivers to the mouth of the Amazon, and much of it goes from there to the United States.

It is in these regions that we find Indians so savage that some of them are said to be cannibals. The children of many of the tribes go about naked or with only a cloth around the waist. The women wear plates of wood and metal in the lobes of their ears. Some of the Indians make war upon white men, using blowguns and poisoned arrows, the slightest scratch of which causes speedy death. The guns are hollow reeds about ten feet in length.

On the eastern slopes of the Andes, by a short ride on muleback, we could reach the Yungas valley where there are plantations of coffee, coca, and cinchona (sĭn-kō′nä) trees.

Have you heard of cinchona? Perhaps not, but most of us at one time or another have had to take quinine. Quinine comes from the bark of the cinchona tree. It is a bitter, white powder especially good for malarial fevers. We shall need to take plenty of it with us when we go up the Amazon.

We see loads of cinchona bark on the streets of La Paz. That little donkey just turning the corner has a bundle of it on each side of his back. Other donkeys are coming behind him, each of which carries a load into La Paz. Here it will be repacked and shipped to all parts of the world.

Let us go and pull out a piece of the bark and take a bite of it. How bitter it is! It tastes like quinine.

Bolivia yields the best of this product, although cinchona trees are found all along the eastern slopes of the Andes between here and Colombia. All of our quinine once came from wild trees, but Java and Ceylon have now great cinchona plantations which produce more quinine than all

A bread peddler of Cochabamba.

Boy Scouts of Bolivia are well equipped and drilled.

South America. Cinchona groves are now being planted in Bolivia.

The bark we tasted on the streets of La Paz was gathered from the forests at the head of the Beni River. It was carried through the woods for miles on the backs of Indians, and was then placed upon the donkeys which brought it to La Paz.

But what is that we see on those other donkeys which are now going by us? They are loaded with great bundles of what looks like dried green leaves. Those are the coca leaves from which is made cocaine, a drug employed to deaden pain. Dentists often put cocaine into one's gum when a sensitive tooth is to be filled.

Coca is chewed by the Indians of the Bolivian plateau much as some men chew tobacco. Every Indian we meet has a lump of it inside his cheek, and men, women, and children are chewing it all day long. The Indians in the mines will not work unless their employers give them, in addition to their wages, a certain amount of coca leaves every day. They would rather have coca than coffee, tea, or tobacco. Vast quantities of it are produced every year. It is shipped on llamas and donkeys to all parts of Bolivia and also to Peru and Chile.

We must not confound coca with cacao, the tree from which our chocolate comes. The coca plant is a shrub which grows from four to six feet in height. It has leaves much like our wintergreen. They are stimulating, and the Indians tell us that chewing them will not only keep out the cold, but will satisfy hunger.

We try a chew ourselves, putting some lime with it as the Indians do; but the leaves taste bitter, the lime burns our tongues, and as the habit is disgusting, we decide to leave coca alone.

Leaving the markets, we walk about through the business

streets, stopping now and then to ask the merchants to show us their goods from our country. We find that Bolivia is using cotton and woolen goods from New England, canned beef and other meats from our great packing centers, and office desks, motor trucks, and automobiles from Michigan. There are many typewriters and small sewing machines, and all the cameras and phonographs so well known to us. We drop into a moving picture show where our films are shown, among them views of Bolivian railroads built by our citizens.

Teachers from the United States are employed in the Bolivian schools, and there is a school for Indians on the shores of Lake Titicaca which is greatly improving the tribes of the high plateau. At La Paz is a college for the higher education of Bolivian youth which is supported by the Methodist Episcopal Church of the United States, and there are other such schools in Cochabamba, a city of about thirty thousand people which is three days' journey on muleback from La Paz. The schools of Bolivia are steadily improving. The boys and girls are becoming fond of athletics, and there are Boy Scouts who do much the same work as our Boy Scouts at home.

We find that La Paz has many well-educated people. It has a public library and a museum, and the country is steadily advancing in education and prosperity.

XVI. THE MINERAL WEALTH OF THE ANDES

AT La Paz we are not far from some of the richest mining regions of the world. The lofty Andes throughout their whole length from the Isthmus of Panama to the Strait of Magellan contain gold. We found gold, silver,

and platinum in Colombia, and copper, silver, and gold in Ecuador and Peru. The Sorata range which now looks down upon us has rich veins of tin, and vast quantities of copper are yearly taken out of the mountains to the north and the south.

There is so much gold on the east slope of the Peruvian Andes that during the floods the streams wash down grains and nuggets of this precious metal. Many of the streams are dry part of the year, and the Indians have paved them with stones so that the gold is caught in the cracks and may be picked up when the water is low. This was one of the mining methods of the Incas, and from it came much of the gold which the Spaniards took from them.

During our travels through Bolivia we see the miners washing gravel in many places. They are usually Indians employed by white men. There are some at work near La Paz. They take the gravel and dirt from the banks of the streams and roll it about in wooden bowls as big as those in which we knead bread. From time to time they throw the muddy water out of the bowls, continuing to do so until nothing but gravel is left. The miners then take out the gravel, handful by handful, looking it over and dropping back into the bowl any little yellow bits they may see. Finally all the stones have been thrown out, and there remains a little pile of yellow pebbles and grains, some of which are no bigger than the point of a needle. This is the gold. Such methods of mining are wasteful, for the gold dust is often so fine that the grains cannot be seen. It is only lately that modern methods of mining have been employed.

When we visit the silver mines we find that most of the work there is done with rude tools. In the older mines the Indians use hammers and drills to break up the ore.

They carry it out of the mines on their backs in sacks of rawhide.

Silver is found in veins of ore in the rocks, and these veins often extend far down under the earth. Some of the mines are very deep. The Indians climb out of them on ladders or notched sticks, with heavy sacks of ore on their backs. They work almost naked, wearing only breechcloths about their waists and singing weird songs as they dig out the silver.

After it is taken out the ore is broken up into small pieces with hammers by women and children. The best of it is then ground to powder by rolling great stones over it. The powder is mixed with mercury, which dissolves the silver out of the dust, and by other chemical processes it is then made ready for the use of man.

Some of the richest silver mines of the world are in the Andes. Here on this high Bolivian plateau is a strip of country, wider than the state of Pennsylvania, and as long as from Philadelphia to Omaha, which is dotted with silver mines. There is one mountain, Potosi, out of which has been taken almost three billion dollars' worth of silver, — enough to make two solid silver teaspoons for every man, woman, and child on the globe.

We leave La Paz by train and ride all day across the plateau to the town of Oruro, a few miles from Lake Poopo. Oruro is a little city lying at the foot of rocky mountains which contain rich veins of silver and tin.

Bolivia was long considered the richest silver mining country on earth. It is now surpassed by one region only in its output of tin, and that is Malaysia, away on the other side of the globe. Some tin is found in Australia, in Cornwall, England, in Alaska near Bering Strait, and in other places, but not in large quantities.

The tin mines of Bolivia are near Lake Titicaca and Lake Poopo, and at other places high up in the eastern range of the Andes. Some of the richest of them are here at Oruro. We visit the mines and watch the Indian women and children breaking the ore into bits and picking it over. Tin ore looks much like dull silver. It is taken out of the rocks with hammers and drills, and then broken to pieces

We leave La Paz by train and take all day to pass from one side of the Andean plateau to the other.

and ground into powder. It is shipped to the United States or England, where it is put into a furnace with other materials and smelted. Common tinware is made of steel coated with tin.

The United States uses more tin than any other country, and one half of our supply comes from these highlands. The concentrates, which are the best of the ore, are taken to smelters and refineries in New York and New Jersey,

and hundreds of tons of metallic tin are made from them every month. We have perhaps washed our faces in basins coated with tin from Oruro, and eaten fruit, fish, or vegetables from cans of the metal which once lay in these mountains.

1. How do we go from Peru to Bolivia? What is the shortest route from New York to La Paz? How did the country get its name? What countries adjoin Bolivia?

2. Compare Bolivia in size with the United States; with your state; with Peru; with Colombia. Describe its two sections. With what part of our country does the plateau compare? To what two great river basins does eastern Bolivia belong? Where do most of the people live? Why?

3. What two countries of South America have no seacoast? How do Bolivian exports reach the Pacific? The Atlantic? Trace a shipment of rubber from eastern Bolivia to San Francisco by water.

4. Describe La Paz and its people. Why might the chief towns be called "Cities of the Sky"?

5. What kind of fruits do we find in the markets? What two medicines or drugs come from Bolivia? What is the difference between coca and cacao or cocoa? Give some of the uses of coca. What do we get from the cinchona tree? In what other parts of the world is it raised? Trace a shipment from there to New York, via the Suez Canal; via the Panama Canal to San Francisco.

6. Who are the Aymaras? What do you know about the Incas? Who are the Cholos? Where are the savage Indians found?

7. Compare the minerals of Bolivia with those of Peru, Ecuador, and Colombia. (See Tables XI, XII, and XIII.) For what is Mount Potosi noted? What is rubber? How is it gathered? Follow the travels of a pencil eraser from the trees of Bolivia to your home. About how far does it travel? What other lands produce rubber? (See Carpenter's "How the World is Clothed," pp. 240–261.)

8. Tell the story of your trip through the tin mines. Give some of the uses of tin. Follow a cargo of tin ore from Oruro to the smelters in New Jersey. What other part of the world produces more tin? Trace a shipment from there to New York. In what part of the United States is tin found? How is tin manufactured? (See Carpenter's "How the World is Housed," chapter 20.)

XVII. CHILE — THE NITRATE DESERT AND THE GUANO ISLANDS

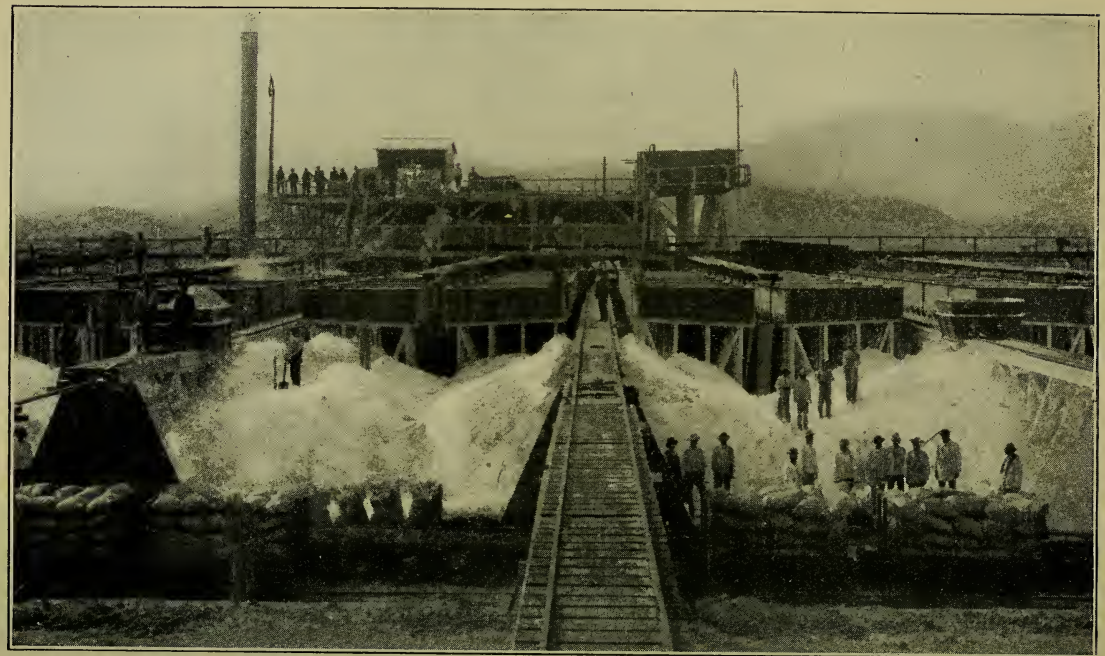
PUT on your dark spectacles this morning. You will need them to protect your eyes from the sun, for we are about to travel again over the glaring sands of the desert. The country about Oruro is sterile, and the part of Chile through which we must pass on our way down to the sea is among the most barren lands of the world.

We take the little narrow-gauge railroad, built from La Paz to Antofagasta to bring the minerals of southern Bolivia out to the sea, and shoot out into vast plains upon which everything looks gray, bare, and forbidding. We cross dazzling fields of salt left by the evaporation of water from the lakes, and go on into regions of volcanic rock upon which nothing green grows.

We are now in northern Chile, that part of the country which belongs to the great South American desert. Chile is so long and so narrow that it has been called the "Shoestring Republic." It lies between the ocean and the crest of the Andes, having nowhere a width greater than the distance from New York to Boston and in some places much less. It is so long, however, that if laid north and south upon our country with the Strait of Magellan at the Florida Keys, its most northern port, that of Iquique (ē-kē′kā), would be in northern Newfoundland.

Notwithstanding its long, narrow shape, Chile has more land than any country in Europe, except Russia. It is larger than our state of Texas. It is rich in mines, farms, and forests. It has the great nitrate beds at the north, the fertile soil of the long central valley, and the forests of the temperate zone at the south.

The country contains nearly four million inhabitants,



A nitrate factory, showing the vats in which the liquor is kept until the salt drops to the bottom.

who, owing to the temperate climate, are vigorous and brave. They pride themselves also on being stronger than the people farther north. They are like them, however, in that they are the descendants of Spaniards and of the mixed Indian race. The difference is that the Spaniards of Chile were chiefly from the northern provinces of Spain and that the Indians whom they married were the famed Araucanians, a stronger and braver race than those with whom the whites united in Ecuador and Peru.

On our way to the coast at over two and one half miles above the sea we pass by Lake Ascotan, on the surface of which are what look like great cakes of ice. Our lips are dry and parched, and we long for a drink. The train stops at a station and we ask the conductor if some of the ice cannot be brought into the car. He replies that the white stuff is not ice at all. It is borax, and the water of the lake is not fit to drink.

He brings us a lump of borax from a pile which has just been

brought to the cars to be sent off to Europe. It reminds us of the finest spun silk wadded into a lump. Borax is used in making beads, glass, and cement, and for glazing pottery ware. It is of value also in preserving meat, fish, and milk, and in some kinds of medicines. It is good for sore eyes and as a wash for the hair. Most of the borax of the world comes from here and from the borax lakes of California.

Is it not odd that such a thing could come out of the earth? Yes, but as we go farther down toward the sea we shall enter a region in Chile that is even more strange. There is a part of the desert where for hundreds of miles the sands are underlaid with a vast bed of nitrate of soda.

We use large quantities of this nitrate in the United States, and more than a million tons are shipped to Europe from this desert every year. Nitrate of soda is employed for making explosives and munitions, and during the World War in Europe the most of the supply from Chile went to the United States and to the allied countries of England and France. In one year our factories used one million tons for ammunition alone. Germany was so blockaded she could not import nitrates, and she had to make her nitrates from the air by electricity.

Nitrates are among our most important fertilizers. They are used in raising tobacco, sugar beets, grain, and many other food crops. Almost every American farmer uses more or less of them, and they are exported largely to Europe. The Chilean government gets the most of its revenues from nitrates, and they are so valuable that cities have grown up on this barren coast, inhabited by the men who dig out the mineral and prepare it for sale. Such a town is Antofagasta, where we end our railroad journey from the plateau to the sea. It is one of the most thriving

ports on the Pacific coast of South America. Making our way on the longitudinal railway through the nitrate fields one hundred and twelve miles to the north, we come to a still larger city, Iquique, the chief nitrate port of the world.

What a queer place for a town! Iquique is on the edge of the sea below rugged hills. It is an oasis city, but there is not a blade of grass in the country about it. It has not a drop of water from year's end to year's end except that which is brought to it in an iron pipe, seventy-five miles long, which connects it with some springs near the foot of the mountains.

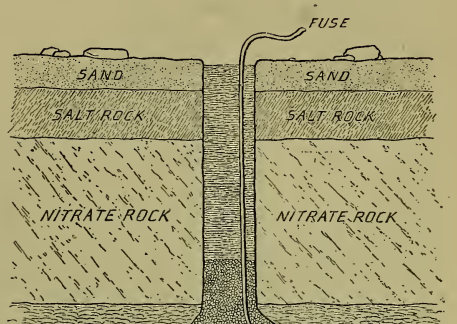


Diagram of nitrate bed.

Still, Iquique is a live modern settlement. It has stores, schools, newspapers, telephones, electric lights, and street cars. We can buy anything we want in its markets, including the most delicious fruits and the best of fresh meats. Such things are brought in by ships from other parts of the coast, and the money to pay for them comes entirely from nitrate.

The nitrate is found on the east side of a low range of hills from fifteen to ninety miles back from the sea. The nitrate beds are usually covered with layers of salt rock and sand, but in some places they lie on the top of the ground. They were probably formed when the desert was

the bed of an inland sea, and the decay of vast quantities of seaweed containing nitrogen produced nitrate of soda. Nitrate is readily dissolved in water, and if the region were not rainless, the beds would have been long ago washed away.

In mining the rock, a hole about a foot wide is bored down through the sand, salt rock, and nitrate to the soft

Blasting the nitrate rock.

earth underneath. A small boy is then let down into the hole. He scoops out a pocket just under the stratum of nitrate and fills it with powder, inserting a fuse which extends up over the top. The boy is then pulled out and the fuse lighted. A loud explosion follows, a cloud of yellow smoke and dust goes into the air, and the earth for a wide distance about is broken to pieces. The nitrate rock is then dug out with picks and crowbars.

The rock must be further treated, however, before it is ready for sale. Pure nitrate of soda is not found in nature, and the rock we see thus blown out of the desert is more than half dirt and sand. It is loaded on carts and carried to factories which have been built in the fields.

The lumps of nitrate rock are thrown into tanks of water

Opening up a trench in the nitrate beds after blasting.

heated by steam and just as common salt dissolves in water, so the nitrate is dissolved while the dirt and sand drop to the bottom. After a time all the nitrate of soda has been taken out of the rock by the boiling water, which now looks like pale maple sirup. This fluid is drawn from the boiler and run into cooling tanks where the nitrate crystallizes and sinks, so that after a time each tank is filled with what

looks like white sugar, while the water on top has become almost clear. The deposit is nitrate of soda. The surface water is now allowed to flow off into vats, where it is saved for the iodine in it. The nitrate is shoveled out into piles to dry in the sun. It is next bagged in sacks of three hundred pounds each and taken on the railroad to the seaports to be shipped to the markets.

Is it not curious that men should go so far and work so hard merely to get food for crops? Plants, like animals, cannot live and grow without nitrogen in their food. The most of the nitrate is used on lands which are expected to yield large and valuable crops.

There is another thing that comes from the nitrate rock that is carefully saved. This is iodine, a crystalline substance of a violet color, very valuable as a medicine and also used in making dyes. It is important as a disinfectant and was largely used in the hospitals and on the battlefields during the World War in Europe for the wounds of the soldiers. Iodine is obtained from the water out of which the nitrate has crystallized.

Good plant foods are so valuable that farmers will pay high prices for them; and vast fortunes have been made from another fertilizer found in this part of South America. This is guano, a mixture of the manure of birds, and of dead seals and fish found in beds on the seacoast, and on several volcanic islands not far from the shores of Peru and Chile. The guano islands are rocks as bare as the desert. They have not a blade of grass nor any green thing upon them; they are merely masses of stone covered with what looks much like sand.

If you stir this sand, it will give forth a smell like ammonia. Put upon the soil, it causes it to produce the most bountiful crops. If we should stay on the islands overnight, we might

see them covered by the birds which for ages have chosen them as their roosting places and homes. They are the homes of pelicans and sea gulls, which feed by the millions in the waters of this part of the Pacific. They often bring the fish they have caught in their bills to the islands and leave them there. During certain parts of the year many

These islands have been for ages the resting and roosting places for millions of pelicans, gulls, and other fish-eating birds.

seals come here to breed, and they often crawl out of the sea upon these rocks to die.

All this has been going on for many years, and the result is a deposit so valuable as manure that ships come here to take it to our country and Europe. A large part of the supply is now exhausted, but there is still some being exported. There are houses upon the islands, put up for the men who dig out the guano, and on one or two of them are

little railroads made to carry it down to the shores. Like nitrate, guano can accumulate and be preserved only in nearly rainless regions.

1. Why is Chile sometimes called the "Shoestring Republic"? What countries bound it on the north and east? What one of the United States is nearest it in size? What republic of South America?

2. What two products come from the desert?

3. Describe Lake Ascotan. What are the chief uses of borax? Where else is it found in large quantities?

4. What is nitrate of soda? For what was it used in the World War? How did Germany get its nitrates during the war? Describe a trip through the fields and tell how nitrate is mined. Why is every American farmer interested in Chile? Trace a shipment from Iquique to a farm near your home. How far does it travel?

5. What other product comes from this salt? Why do our soldiers carry it with them in battle?

6. Where are the two chief nitrate ports? Why are the guano islands of value to the world?

XVIII. ALONG THE COAST TO VALPARAISO

IT takes us five days to go from Iquique to Valparaiso, the chief seaport of Chile. The sail is delightful. There are but few storms along the west coast, and almost every day we make a new port at which we see many strange things. The desert continues and we are always in sight of the Andes. Luscious grapes and oranges are brought to the steamer from the valley oases, and we now and then take on a few barrels of wine.

While our steamer stops at Antofagasta we have time to visit one of the largest smelters of South America. It

has been built here to smelt the silver out of the ore brought from the Andes. The ore is first ground to powder and made into bricks. As we pass through the yard we see a large plot of ground upon which are piled enough bricks to build a big house. It is perhaps the richest brickyard on earth. The bricks look like blocks of gray sand, but they are really silver ore, ground fine and molded into this shape so that the ore may be more easily smelted. The smelting is done in huge furnaces, the ore being heated with other materials which extract the pure silver.

Farther down the coast we anchor at Coquimbo (kō-kēm′bō) to take on a big load of copper. Hundreds of heavy bars or pigs of reddish-brown metal are brought out to our steamer on a lighter and stored in the hold.

This copper comes from mines owned and operated by a great United States company, and the metal is sent north through the Panama Canal to New York. There are other large copper mines owned by the same company near Antofagasta and also at Braden in the mountains near Santiago much farther south. We learn that Chile has vast deposits of rich copper ore. It was until 1875 the chief copper producer of the world, but now it is surpassed by the United States and Japan. The copper is in nuggets or veins. The ore is mined, smelted, and shipped all over the world.

Near Coquimbo is also a mountain of iron ore which belongs to one of our large steel corporations. The mountain contains more than two hundred million tons of ore rich in iron. The ore is taken out and sent via the Panama Canal to the steel works at Bethlehem, Pennsylvania, and other places not far from our Atlantic ports.

Soon after leaving Coquimbo we notice that the shores have lost their gray, dusty look, and we occasionally see

The wharves at Valparaiso are equipped with electric cranes for loading and unloading vessels.

a tree and a patch of green grass. We are out of the desert at last.

We sail about two hundred miles farther south and finally come to anchor in the Bay of Valparaiso. It is shaped like a half-moon, being walled with steep hills covered with luxuriant trees and beautiful flowers. A few miles inland are orange and lemon groves, vineyards, and trees bearing almost all kinds of fruits; and just over the mountains is the long valley of Chile, one of the richest farming and fruit-raising regions of all South America. The climate is like that of Italy and California.

At Valparaiso we are not halfway to the southern end of the Chilean coast. In a land extending so far north and south we must expect all sorts of climates. It was hot at Antofagasta, but the winter air at Valparaiso is pleasantly cool, and near the Strait of Magellan the ground is often covered with snow. There is a great difference in the amount of rainfall. In the northern desert one never needs an umbrella, but Valparaiso has occasional rains throughout the year. It rains more and more farther south, and in some places so much water falls that the people jokingly say it rains thirteen months every year.

But what is the cause of the change? Why is northern Chile dry and the greater part of southern Chile so wet? It comes from the winds. We have learned that the desert exists because all the water-laden winds come from the Atlantic and have had the water taken out of them before they reach the west slope. The winds of southern Chile blow from the Pacific Ocean toward the east. As they cross the Pacific they are filled full of moisture, and when they rise over the land the cooling of the air causes rain to fall. Hence we find copious rains feeding the many streams that flow down the western slope of the Andes.

On the other side of the mountains the country is almost a desert, for the Pacific winds are dry when they reach there.

Valparaiso is almost as large as Indianapolis. It is the chief port on the west coast of South America, owing its growth to its excellent harbor and the rich country behind it. It was almost destroyed by a great earthquake in 1906, but it has since been rebuilt. We come to anchor among steamers from different parts of the United States and Europe. They are loading and discharging goods. Some are taking on cattle, wheat, vegetables, and fruits for the cities of the desert farther north, and others are adding to their cargoes of nitrates, copper, and hides, which they are transporting from Chile to Europe.

The business of the port has been greatly increased by the Panama Canal, and there are lines of steamers which sail regularly between Valparaiso and New York. They carry ores and nitrates as well as hides and wool, and eventually they will transport quantities of fruit, for Chile has all the fruits of California, and as it is south of the equator these fruits are ripe in the midst of our winter. Grapes, melons, and peaches may thus be sent in cold storage to New York and Boston. Returning, the ships bring back to Chile cotton and woolen goods, manufactures of iron and steel, electrical machinery, locomotives, motor-cars and tractors, and many kinds of farm tools. Shoes made in New England are sold here, and leather made in Chile is imported by the United States.

We take a boat to the shore, wondering how we can get up the hills to the houses above us. Valparaiso rises from the water like the grandstand of a ball ground. The streets are in terraces, one above another, so that the buildings at the top seem to hang out and threaten to fall upon those below.

But see, there are cable cars climbing the hills! It is by them we shall mount from one street to another, for the only level land in the city is a narrow stretch along the shore. This is the business part of Valparaiso, and it was built for that purpose. The hills were leveled and walls were built to protect the land from the waves.

We step from our boat upon stone wharves and walk over streets as well paved as any in our cities at home. The buildings are large, and the stores have plate glass windows. There are English names over some of them, and we learn that Valparaiso has many Europeans who have come here to engage in trade.

The people do not look very different from those of New York and Chicago. There are electric lights, motor-trucks, and automobiles. We hear boys crying the newspapers and remember, as we notice the signs of enterprise about us, that the Chileans are among the most progressive of the South American peoples. We hear many of the Chileans speak English, and as we look at our surroundings we wonder whether Chile is, after all, much different from the United States.

But stop! Here comes a lady with a black shawl draped about her head, and behind her is a vegetable peddler with his stock in panniers on the sides of a donkey. There is a bread mule, ridden by the baker, and a milk mule is going down that side street. Get out of the way of that carriage with its high-stepping horses and look out for the horse coming around the corner! Its rider wears a poncho and a broad-brimmed hat. He is probably a rich farmer from the country. We shall see many of his kind later on.

What a queer street car is that one going by us! It has seats on top as well as inside. See the pretty woman in uniform on the rear platform? She is taking the fares

The bread mule of Valparaiso is an improvement on the bread man of Cochabamba.

and making the change from her white apron pocket. There are women conductors in all the chief cities of Chile. The custom was introduced long ago when Chile was at war with Peru and the men were needed as soldiers.

But Valparaiso has so many foreigners that we must go inland to see how most of the Chileans live. The country has many railways, and we decide to make our first journey on the Transandine line.

XIX. ACROSS SOUTH AMERICA BY RAIL

WE have already seen something of the railroads farther north which go from the west coast to the top of the Andes. Let us look at a map representing the railways in use and the new lines projected. Chile has iron tracks from one end almost to the other, and its public roads if joined together would reach around the world. The first railways of the country were built by a Californian, and many of the rails, locomotives, and cars now in use came from the United States. Some of the railways are operated by electricity rather than steam. Fuel is costly, and the short, fast-flowing streams give an abundance of power with which to generate electric current.

The road upon which we are riding to-day has brought the Atlantic and Pacific oceans together. It is the Transandine railroad from Valparaiso to Buenos Aires. Our car is a Pullman and we can see the country well as we go. Leaving Valparaiso, the train skirts the harbor, passing through the rich suburb of Vina del Mar (vē′nä dĕl mär′).

How soft the air is and how sweet the smell of the trees and grass after our long stay in the desert! Morning

glories are blooming on the fences, and that great bush over there is loaded with roses. Now we whiz by an orange grove, almost close enough to pick the yellow balls peeping out of the leaves, now by vineyards, and now stop at a station at which pears, figs, and lemons are brought to the car windows for sale. How cheap everything is! We can get a basket of grapes or all the oranges we can eat for a dime.

By and by the road leaves the coast, and we climb over the hills to the central valley which forms the best farming region of Chile. There is but little green except where the land is irrigated. See the men at work in the fields. There is one plowing. He has two white oxen joined to the plow by a pole. The pole is tied to the yoke, which rests on the necks of the oxen just back of the horns, to which it is fastened with strips of rawhide.

The houses of the Chilean towns are similar to those we saw on the coast of Peru. There are many huts in the fields. They are made of mud with roofs of straw thatch, or sheet iron.

As we cross the coast range the farms grow larger and the country is more thickly peopled. We ride for some time through the irrigated valley of the Aconcagua River with the mighty mountains rising above us. We now pass orchards of apples and peaches, with rich, well-watered gardens high up in the hills. The country grows wilder, and at last we are at Los Andes (lōs ăn′dās), the last station of Chile. We are near the frontier of Argentina, where the road joins the Argentina railway that crosses the Andes and goes on over the pampas through the farms and pasture lands to Buenos Aires. We have not time now to make the whole journey, for we expect to go around the southern end of the continent by the Strait of Magellan.

THE CUMBRE
12,300 ft. above sea level
Boundary line between Chili and Argentine Republics
ENTRANCE to TUNNEL FROM ARGENTINE
10,946 ft. above sea level

On the Transandine railway. The cross marks the site of the Christ of the Andes, 2000 feet above the tunnel.

So we shall ride on the railroad only to the top of the mountains; from there taking mules to see something of this part of the Andes before returning to go farther south.

Our mules take us over the old wagon road that crosses the mountains at the Uspallata (o͞os-päl-yä′tä) Pass. This is about two and one half miles above the sea, and the place where it crosses the boundary between Argentina and Chile is marked by an heroic bronze figure upholding a cross, with these words on the pedestal:

"Sooner shall these mountains crumble to dust than Argentines and Chileans break the peace to which they have pledged themselves at the feet of Christ the Redeemer."

This statue is known as the "Christ of the Andes." It was erected fifteen years before the close of the World War, and we are impressed with the fact that these South American republics so long ago strove for international peace and brotherly love.

The old road over the Andes can be traveled easily in summer. In winter the snows are so heavy that men are often lost in the storms and sometimes spend many days on the way. That is why the little stone huts we pass now and then have been built. They are to shelter the passengers and mail carriers when caught in the storms. Men sometimes have to wait here for days for the storm to cease. The huts have no windows, and are more like bake-ovens than houses. There are also several rude inns where we stop. The hot soup tastes good, we are so cold.

This range of the Chilean Andes is wild in the extreme. One of the worst parts of it is the pass called the Valley of Desolation. It is covered with volcanic rock upon which nothing grows. The only life to be seen are the

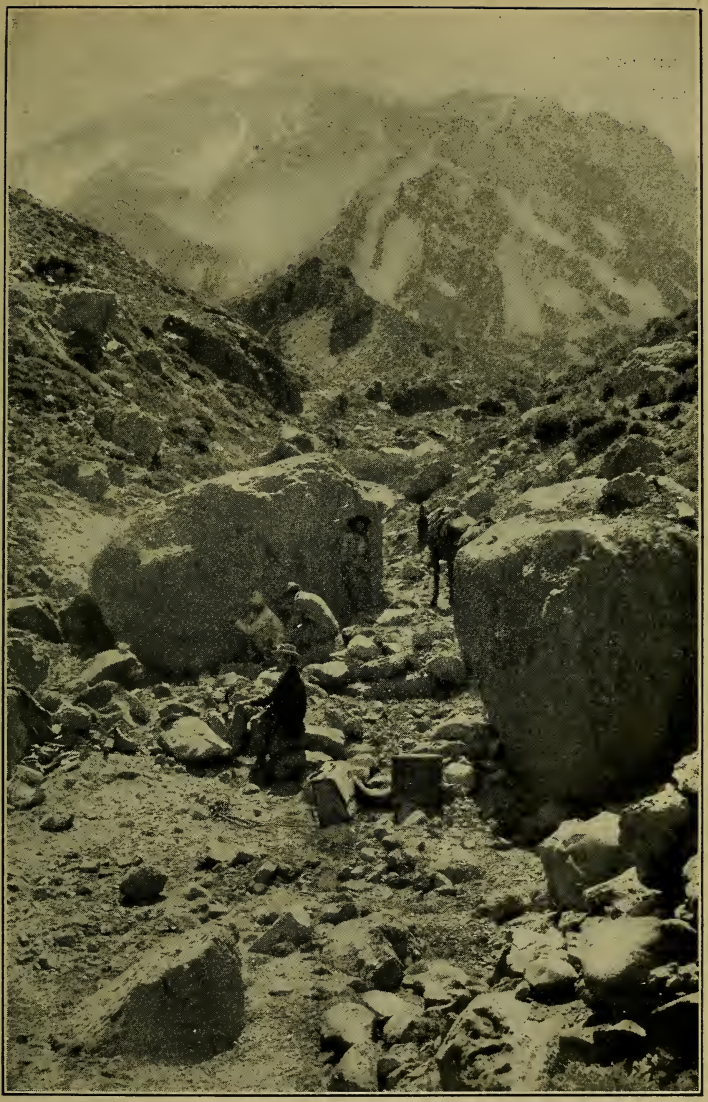
The Christ of the Andes, a bronze statue erected to commemorate the making of peace between Chile and Argentina.

condors soaring high overhead or the guanacos racing over the snow. There is a condor flying between us and the sun. It casts a black shadow upon the white snow. Condors are like vultures. They will eat any dead animal, and we are wondering whether the mighty bird is not waiting to see us drop in our tracks.

The highest part of the Transandine railway was difficult to build. It has many tunnels. The cars are taken up the steepest part of the mountains by a track like that up Pikes Peak and Mount Washington. This track has three rails. In addition to the two of the ordinary railroad there is a third rail with rungs in it like a ladder. Upon this moves a cogwheel attached to the car, and the little engine runs behind the train and pushes it up the mountains. About two miles above the sea is a tunnel, and there are also many snowsheds cut out of the solid rock to protect the trains from drifts in the winter.

The Transandine railway is of great good to South American travelers. We shall see why as we go to Buenos Aires by the old route around the southern end of the continent. The voyage from Valparaiso by the Strait of Magellan takes from fourteen to sixteen days and is often stormy and rough. By the railway, the distance is eight hundred and eighty-eight miles, or less than that between New York and Chicago, and passengers are carried across the continent in twenty-nine hours. This makes the trip from Europe to the west coast of South America much shorter, and travelers from Great Britain to Australia can reach Buenos Aires in about twenty days, cross South America by rail, and take ship at Valparaiso, instead of making the long voyage through the Strait of Magellan, or the shorter one by the Panama Canal.

This railway is now the chief route across South America



The Valley of Desolation, showing Mt. Aconcagua.

from ocean to ocean. There is another transcontinental route that connects with the Argentine railway system by the road on which we came from La Paz to Antofagasta, but it is longer and higher and will never have much through passenger traffic. The Chileans plan to build several railways south of where we are now, and some of these will go to the port of Bahia Blanca on the Atlantic. A road is planned from Paita, a port of Peru, to the navigable waters of the Amazon, and the Oroya (ō-rō′yä) railway will sometime be extended to other tributaries of that river. Indeed, South America is a continent of the future, and vast territories now practically unknown will some day be opened by railroads.

The condor has a wing-spread of nine feet and soars easily above the highest peaks of the Andes. Like the vulture, it lives largely on carrion.

During our travels we have fine views of Aconcagua, the highest of the Andes. When the sky is clear it can be seen from Valparaiso, rising in a cone high above its sister mountain and dwarfing all the peaks near it except Mount Tupungato (to͞o-po͞on-gä′to), which is over four miles in height. Aconcagua is more than twenty-three thousand feet high. It is the highest point on the

South American continent and is almost three thousand feet higher than Mount McKinley, the highest point in North America. Aconcagua is one of the mountain sights of the world. As we look at its snowy top we long to climb it, but if we should make the attempt we would probably meet with snowstorms and be frozen by the intense cold on the peak. There are cliffs near the summit, and at the top is a square plateau of ice about two hundred feet wide. Standing there, we might see great masses of fleecy clouds far below us, with the mountains stretching away to the east and the south. On one side would be the pampas of Argentina, and on the other, over the rich central valley of Chile, ninety miles away, would be the shining, silvery Pacific. This climb can be made only in summer, and our guides will not allow us to make the attempt. We must be satisfied with the magnificent views we had as we rode through the pass. So we remount our mules and slowly go back down the hills to the railroad. Here we take the train for Los Andes, where we change cars to the line which brings us at last to Santiago, the Chilean capital.

XX. SANTIAGO, THE CAPITAL OF CHILE

SANTIAGO, the capital of Chile, is almost as large as our national capital and like it in many ways. Washington is six hours distant from our chief seaport, New York. Santiago is about six hours by rail from Valparaiso, the chief seaport of Chile. Washington lies in a basin only a little above sea level on the bank of the Potomac. Santiago is at an elevation of two thousand feet in the central valley of Chile. It is cut in two by

View of Santiago from Santa Lucia. Low buildings with rather flat roofs and interior courts.

the river Mapocho (mä-pō′chō), and the basin in which it is built is walled by the snowy Andes and by low mountains which rise one above another from grassy plains.

We have our Capitol Hill, one hundred and ninety feet above the Potomac. Santiago has its Santa Lucia (lo͞o-sē′ä), a mass of volcanic rocks more than twice as high. Rising precipitously from a base of six acres in the midst of the city, Santa Lucia is perhaps the most picturesque park of the world. It is composed of rocks piled together in curious shapes. There is earth mixed with the rocks so that trees grow among them. Flowers and vines have been planted, and the sides of the hill are covered with English ivy. From its base to its summit tall eucalyptus trees rise out of the crevices of the rocks. It has wonderful ferns, dark caves, and beautiful grottoes in which are waterfalls, making altogether what might be called a hanging garden above the city, under the shadow of the Andes.

There are winding driveways and footpaths which go round and round the hill to the summit where the band plays and where they have moving-picture shows under the sky. We walk up one of the paths to take a look over Santiago. It is early morning and the sun is just rising in the great blue dome of the heavens. It has caught the ragged, rocky peaks of the Andes at the back of the city, and the snows upon them look like frosted silver incrusted with diamonds. The foothills in the shadow seem to be of blue velvet, and away off in the distance are the plains with their rich growth of green.

Our eyes now drop to the city below us. Red-tiled roofs extend far away on all sides. Each roof surrounds a *patio* in which is a garden with shrubs and trees. The scene is not unlike that we saw from the top of our hotel in Lima. The houses are built in the same style. They are close to

the street and consist of rooms built around open court-yards. Some of them are of vast size although few are of more than two stories.

See that wide avenue which cuts the city almost in halves! That is the Alameda, the chief street of this South American capital. It is more than twice as wide as Pennsylvania Avenue in Washington, and four miles in length. There are rows of poplars, oaks, elms, and acacias running through it from one end to the other, and stone aqueducts in which mountain water is flowing. A stream of traffic is moving back and forth on both sides of the avenue. We can see automobiles and motor-trucks winding their way in and out among the ox wagons and carriages.

Taking our field glasses, we pick out the statues of many Chilean heroes under the trees, and see the stone seats upon which men and women are sitting enjoying the air. Boys on bicycles are riding along the paths in the center of the street, and at every few hundred feet there are two or three cows with their calves beside them. Each of the calves wears a muzzle. The cows are tended by women, who sell the milk warm from the cow. They are hobbled by ropes about their hind legs.

But let us go down from the hill and take a street-car ride through the city. The seats on the roof are the best for sight-seeing, so we climb up, give our fare to the woman conductor, and are soon rolling along, as high as the tops of the one-story houses, through the suburbs and poorer parts of the town. A little later we are passing through the best business section. How fine the stores are! They are equal to those of our cities at home. The show windows have all kinds of beautiful goods. There are several great arcades roofed with glass, which have been cut through the business blocks from one side to the other.

We go by the Palacio de la Moneda. It is a great building, containing the offices of the president and those of some of his cabinet ministers. At the door are soldiers with drawn swords in their hands. Later on the president of Chile comes forth with the military guard of two hundred cavalry which accompanies his carriage on all state occasions. The Chileans are fond of pomp and display. We meet policemen with swords at their sides on every street corner, and we shall see soldiers drilling in every city and town. Chile is a republic with a government not unlike ours. It has a president and congress and a system of courts. In that building over there congress is meeting. The men going in are senators and deputies who make the laws just as we do in our congress at home.

In Santiago arcades roofed with glass run through the blocks and furnish space for shops and shelter for shoppers.

At the post-office department we learn that millions of letters and newspapers go through the mails every year

and that telegraph lines cover the republic. The prices for telegrams are lower than ours. There are wireless towers in different parts of the country, and long-distance telephones over which one can talk from Santiago to all the chief cities. Many of the towns have electric street cars, and nearly every one is lighted by electricity. Later on we visit the museum, the national picture gallery, and the public library, which has more than one half million volumes. We go to the colleges and spend some time in the public schools. The schools are much like ours, save that the girls and the boys are kept in different buildings and the children of the lower grades study out loud. Chile has a good public school system. There are schools in every city and village, although only one out of every five children attends school. Santiago has two large universities, and there are also schools of mines, of engineering, of agriculture, and for the army and navy.

The Chileans are so strong, progressive, and intelligent that they have been called the Yankees of South America. This is largely because they have a temperate climate like ours. Although their language is Spanish, many of the people speak also French and English, and some have been educated in Europe. In all the cities there are daily newspapers. We meet newsboys on almost every street corner, and find large bookstores in the business sections.

During our stay at the capital we are invited to visit the homes of some well-to-do Chileans. We are surprised at the size of their houses. They are of only one or two stories, but many have forty or more large rooms which are furnished as expensively as the palaces of our millionaires. They have fine paintings and statues, and those in the suburbs have large gardens about them, in which are lemon and orange trees and all kinds of beautiful flowers.

But how about the poor? All the Chileans cannot be rich. No, indeed. There are poor people everywhere. We see them driving carts, carrying goods on their backs through the streets, and engaged in all sorts of hard labor. We shall find them living in mud huts on the farms, and we remember how we rode on the top of the street car through sections of Santiago filled with low one-story houses where whole families live in one room. In many cases the poor people sleep on the floor, and their food costs but a few cents a day. They are of the mixed race of Spaniards and Indians. We shall see much of them in our trips through the country.

XXI. A VISIT TO A CHILEAN FARM

WE are starting to-day from Santiago through the central valley of Chile, which lies between the main range of the Andes and the low mountains which border the coast. It is over a hundred miles wide in places and as long as from New York to Pittsburgh. This valley is rich, for it is covered with earth washings from the mountains, and the soil is several hundred feet deep. It is divided into large estates upon which all the fruits and grains of the temperate zone are grown, and where sheep, cattle, and horses are grazed in great droves. The chief crops are wheat, barley, and oats. There are great orchards and vineyards, and almost one half billion pounds of grapes are gathered in a single year. The valley is like the central valley of California in position, climate, and products. Chile is one of the chief wheat countries of South America. It ranks next to Argentina, and millions of bushels are exported every year.

Huge carts drawn by oxen are used for farm wagons.

There are few countries where farms are so large or their owners so rich as in Chile. More than half the people are engaged in farming, but the land is owned by a very few families. We meet men who each have thousands of acres, and the wealthier farmers live like lords upon their estates or haciendas (ä-syēn′däs). Agriculture is profitable in Chile. The country annually produces millions of bushels of wheat and barley, millions of gallons of wine, and the best horses and sheep on the west coast of South America.

Most of the farms are in this great central valley. They are irrigated by the streams from the mountains, and often are cultivated like gardens. The fields are divided by canals bordered with poplars, eucalyptus, or other tall trees. Some of the estates have stone walls about them, and others have fences of wire or boards. We look in vain for barns, haystacks, and farmhouses like ours. The only buildings are the vast one-story homes of the owners and the mud huts of the workmen. Huge carts drawn by oxen with yokes tied to their horns are used for farm wagons, and the plows are dragged through the furrows by the same clumsy beasts. The more enterprising Chileans, however, have been lately introducing modern machinery, and some of the rich farmers have tractors, plows, threshers, and reapers made in our country. Some have their own electric power plants, operated by the streams which flow through their farms.

We visit one of the farms and are entertained by the owner. Our host is a rich haciendado who lives in Santiago, and comes here only in summer, but nevertheless has an enormous establishment. His house has several acres of rooms, all on the ground floor. The residence is composed of one-story buildings with red tiled roofs,

The haciendas, or farms, are so large as to require many overseers, who ride about on horseback.

mud walls, and brick floors, surrounding green courts and gardens. Groves of trees, some of which are one hundred feet high, shade the houses.

There are many other guests at the time of our visit, among them about thirty children. Nevertheless, when we go out to ride there are horses for all. The smallest children are tied to the saddles to keep them from falling, for the children learn to ride when quite young. Every child of this farmer has his own pony, and we see boys and girls between the ages of four and fourteen galloping over the fields holding their seats like men and women.

The farm is so large we might ride all day through the fields and not visit it all. The chief roads are lined with Lombardy poplars.

We are delighted with the horses. Their gait is so easy that we can remain in our saddles for hours without tiring. They are directed by pressing the reins against the neck, and not by pulling at the bit as we do. The reins are usually left loose, and as a result the horses are seldom hard in the mouth. Later on we look at stock. There are great herds of fine cattle and flocks of fat sheep. The crops are growing luxuriantly, and the vineyards and orchards are loaded with fruit.

We ask how such a place is managed. It has a major-domo, or chief, who organizes his laborers much like an army. Each overseer has so many men, and he tells each man what to do every day. Books are kept to show just what money is paid out and what for, so that the owner knows how well each field is paying.

Indeed, the only poor things on the farm are the inquilinos (ēn-kē-lē′nōs), or farm hands. They are the laboring class of the country, somewhat like the Indians we saw in Peru and Bolivia. They come of the mixed race of Spaniards

and Indians, inheriting the bravery of both. The Peruvian and Bolivian Indians are afraid of their masters; the inquilinos are not. They carry knives, and the employer who would strike one of his laborers would probably be stabbed in return. Nevertheless, it is said that the inquilinos love their masters, and they seldom leave the estates upon which they were born.

Let us enter one of their huts. What a contrast to the luxurious city home of the owner! The walls are of mud and the roof is of thatch. The ground forms the floor and, in this case, the bed of the family. Two boxes and a table are the only furniture. The hut has but one room about fifteen feet square, and we are told that eight persons live in it. It seems impossible that they can exist in such close quarters, and when we learn what they eat we wonder the more. Their breakfast usually consists of a double handful of toasted wheat flour mixed with water into a mush or baked as a cake. At noon they have a bowl of hot beans, and for supper, or dinner, as they call it, a second bowl of beans, to which is added some toasted meal. The inquilinos seldom eat meat, preferring to spend their money for drink.

As a result of this mode of living many of the children die, but those who survive are able to withstand almost any hardship. The men are so strong that four of them can easily lift a piano on their heads and trot away with it. I have seen them carrying nitrate bags weighing three hundred pounds each and tossing them about as though they were feathers.

The inquilinos are polite. They are kind to their families, and are always ready to help one another in trouble. It is difficult to teach them habits of thrift; but common schools have now been established almost every-

where, and it is believed that they will in time reach a higher state of civilization.

1. Mention two important metals we get from Chile. Locate Coquimbo. Why is it important to us? What two South American countries produce the most copper? Compare their product with that of the United States. From what other countries do large supplies of this metal come? (See Table XI.)

2. Give an airplane view of Chile. Describe the three different sections as to climate and products. Why is northern Chile so dry and southern Chile so wet?

3. Describe the port of Valparaiso. How far is it from New York? From San Francisco? Mention some of the goods awaiting shipment to the United States. What do we sell to the Chileans? Trace the route of a shipload of our cotton from New Orleans to Valparaiso, via the Panama Canal. Trace a cargo of iron ore from Coquimbo to Bethlehem, Pa. A cargo of copper from Antofagasta to New York via Panama; via the Strait of Magellan.

4. What great American port was destroyed by an earthquake? Compare it with Valparaiso.

5. Why do the cities of Chile have women street-car conductors?

6. Compare your trip across South America by rail with one from San Francisco to New York; from New York to Chicago. How far is it from Buenos Aires to Valparaiso? How long does the journey take? Mention other possible routes from ocean to ocean. Why are some of the railways of Chile operated by electricity?

7. What is the highest mountain of the Andes? Compare it with Mount McKinley, Mount Elbruz, Mount Everest. Describe the "Christ of the Andes."

8. In what ways is the capital of Chile like the capital of the United States? How does the government resemble ours? What is the chief religion of Chile? Explain why the Chileans have been called the Yankees of South America.

9. Why is the central valley of Chile like California? Compare it with southern Chile. Compare one of the farms with a farm near your home. What do they grow on these farms? What are the principal wheat countries of South America? (See Table X.)

10. Who are the inquilinos? How do they live?

XXII. SOUTHERN CHILE AND THE ARAUCANIANS

WE have left our friends in the country and are again on the train. We travel several hundred miles southward through the great central valley. On our left are the snowy Andes with steam rising here and there from a volcanic peak. We cross little rivers and go through vast wheat fields cut up by ditches in which clear water flows.

How many vineyards there are! The hills are covered with low grapevines now brown and leafless, for it is winter. See that drove of cattle at the side of the road, with the men on horseback driving the animals this way and that. They are rounding up the young and branding them with hot irons. In the next field are more than a thousand horses, and we shall pass many cattle on our way farther south.

See the trees which border the fields! The irrigating ditches are lined with lofty poplars all leaning north, blown so by the winds, which usually come from the south. They look like hedges a hundred feet high running between the green fields.

What is this broad stream we are crossing? It is the Biobio (bē-ō-bē′ō), the largest river of Chile. It rises in the Andes not far from the Argentine boundary and flows across the country, emptying into the Bay of Concepcion. How wide it is! The steel bridge which we cross is one of the finest in South America; it seems more than a mile long.

There are woods on the banks of the Biobio, and from now on we shall frequently be in the forests. There are no more irrigating ditches, for the rains furnish plenty of water for the woods and the crops. We have at last come

into the forest region of Chile. It extends from here to the Strait of Magellan, and we see cypress, oak, beech, and other hardwood trees of the temperate zone. The bark of many of the trees is good for tanning, and we shall find large tanneries and other leather-making industries here and farther south.

Araucanian Indian — bronze statue in Santiago. The Araucanians of Chile were much better fighters than the Incas of Peru or the Aymaras of Bolivia.

The wheat fields we are now passing have been cut out of the woods. They look like our fields in the new lands of the Northwest. There are stumps in them. The houses of the poor are made of logs. We see men at work felling the trees. Those long teams of oxen are dragging out lumber, their big, soft eyes looking sadly at us as they painfully pull the heavy loads by their heads.

Notice the people at the station. How different from

the laborers we saw in the north! They are dark faced and fierce looking. They are more warmly clad. The men wear ponchos; and many of them have on high boots covered with mud.

Listen to that group at the corner. They are talking in German and they do not look like Chileans. They are

Araucanian Indians weaving ponchos.

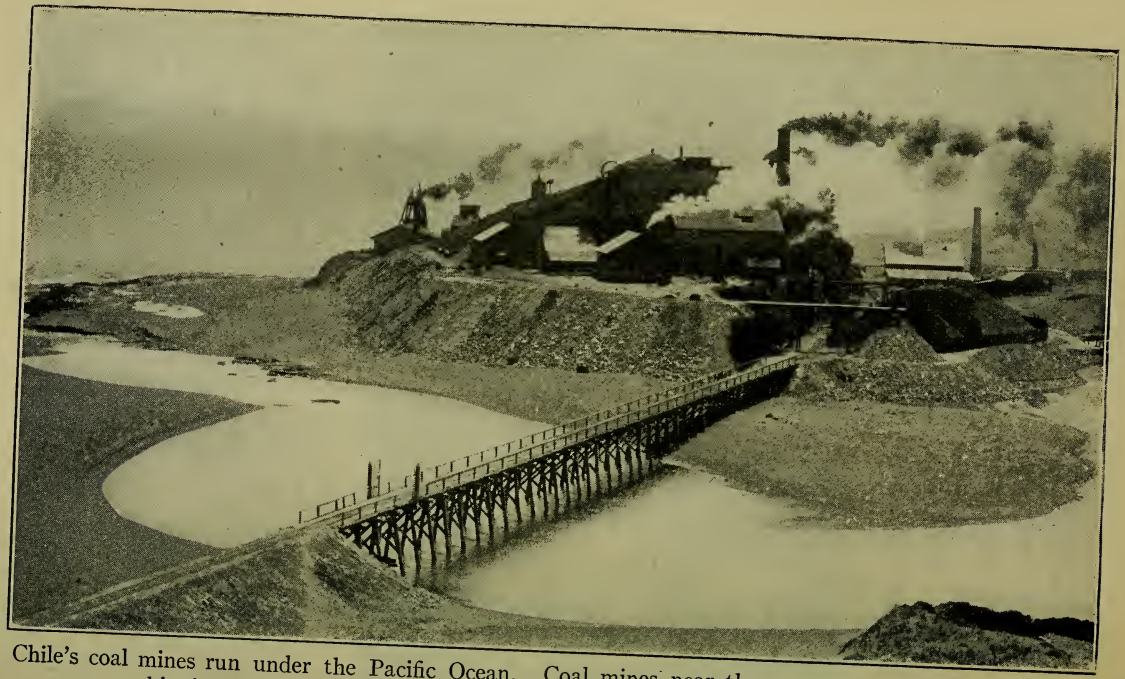
German settlers who have come from Europe to farm the land, which the Chilean government sells to immigrants at a low price. We shall see many Germans in this part of Chile. They have taken up farms and often own stores and factories. The city of Valdivia (väl-dē′vyä) has large tanneries in which German workmen make fine leather for shipment to Europe. The trees have good bark for tanning, and the many cattle make the hides cheap.

But who are the copper-colored people we meet everywhere? They wear gorgeous ponchos woven in stripes of bright colors. The women have bare arms. They wear long, blanketlike dresses wrapped tightly over their chests and falling to the feet. Some have square silver earrings half as big as a schoolbook and as thick as its cover. Others have silver plates on their bosoms and bands of silver beads about their ankles and necks.

They are Indians, the descendants of the famed Araucanians who inhabited Chile when the Spaniards first came. They were noted for their bravery, and were quite as brave as our Indians. It is said that more Spanish lives were lost in attempts to conquer these Indians than in all the Indian wars in Mexico and Peru. The struggle lasted more than a century and ended by leaving to the Araucanians a great part of southern Chile. Since then most of this has been taken away and they live on reservations or have farms of their own. Alcohol has made the Araucanians a nation of drunkards, and their bad habits are fast killing them off. They are now less in number than when they first fought the Spaniards, and they grow fewer each year.

XXIII. IN THE COAL MINES OF CHILE

WE have left the land of the Araucanians and are now in the city of Concepcion (kŏn-sĕp-syōn′), two hundred miles south of Valparaiso. It is the chief port south of Valparaiso, and its people say it will soon be the chief seaport of the southern Pacific coast. It has two excellent harbors near by, Arauco (ä-rou′kō) Bay and Talcahuano (täl-kä-wäh′nō), and is so connected by railroads with all



Chile's coal mines run under the Pacific Ocean. Coal mines near the seacoast are of great value to shipping. These are the most important coal mines in Pacific South America.

parts of the country that it has a great trade. Valdivia and Puerto Montt (pwär'tō mōnt), two other ports farther south, are rapidly growing.

Concepcion is the largest city of southern Chile. It is a flat Spanish town with a plaza in the center, and streets which cross one another at right angles.

This part of Chile contains some of the chief coal fields of western South America. There is but little coal to the north of them, and coal is brought in by the shipload from Australia and England. The coal of Chile is not so good as that which is imported, and it must be sold at a lower price. The coal fields lie along the ocean for a distance of almost one hundred miles, and are so close to the sea that they can be worked at a profit.

The steamer in which we are to take passage for the Strait of Magellan has stopped in Arauco Bay to take on coal. She now lies at anchor near Lota, with great barges of coal at her side. We see sooty-faced men standing on the coal and shoveling it on board. The ship is bound for Hamburg, via the Strait of Magellan. She must steam about five thousand miles before she can get fuel again. It takes a vast deal of coal to make steam for such a big ship. It uses more in one day than many families can consume in a year, and it will keep the men shoveling until night to load up.

We are told that we shall have time to visit one of the mines before the ship sails. We are tired, and at first think it hardly worth while, until the captain says that some of the coal beds slope from the land down under the ocean, and that the coal they are now shoveling on board comes from under the sea.

We want to see a mine, and call a small boat which is near the ship waiting for passengers to take us on shore.

We are landed at the entrance to one of the greatest coal mines. The works above ground are large buildings situated upon little islands connected with the coast by a railroad built upon piles. We ask the manager if we may visit the mines, and he kindly sends a guide with us.

We are taken to a great shaft or well in which, by a steam engine and pulleys, two elevators are raising cars filled with coal and lowering empty cars to the bottom. We step upon the elevator that is going down, and drop into darkness. Down, down, down we go, until at last rays of light shoot up from below. Our speed grows slower, and we stop at a long tunnel with a line of electric lights extending on and on in front of us, growing less and less in size until they fade into stars in the distance.

As we step out of the shaft a train of loaded cars comes thundering toward us. We see that it is moved by an overhead trolley like the electric street cars of some of our cities.

But there is another train going back into the mine. Can we get on? Yes; a special car with seats upon it has been attached to the train for us. We climb upon the platform and speed away over the track at the rate of twenty miles an hour. Within a few moments we leave the shore and are soon far out under the bed of the Pacific Ocean.

We are moving through a tunnel which has been cut out of the great blanket of coal which lies between the layers of rock. As we go on we pass openings to the right and the left. They are the entrances to tunnels, made to get out the coal.

Think where we are! We are hundreds of feet under the ocean, and big steamers are floating above us. And still it is dry. Not a drop falls on our clothes or hats, for the great beds of stone overhead are such that the water cannot get through.

As we ride on, a train passes now and then. In the tunnels at the sides we see half-naked miners covered with dirt, digging the coal and loading it upon cars.

What is that boom, boom, boom which sounds as though the sea were breaking through the rocks away at the right? That is the blasting. There is no danger where we are now, but we must beware, for if such an explosion should occur near us it might blow us to pieces.

What a great mine this is! There are hundreds of men at work in it, and vast quantities of coal are taken out every day.

We ride back to the shaft on a train of twenty-seven loaded coal cars, and another train arrives while we are waiting to ride to the top.

Now we are back at the steamer again. It is almost ready to sail. It has loaded a thousand tons of coal in the last twenty-four hours, and in a few minutes will start on its long voyage to Europe around the southern end of the continent.

The vessel carries a vast deal of freight. Below deck are three thousand tons of nitrate of soda, two thousand barrels of liquid honey, and great rolls of sole leather, all going to Europe via the Strait of Magellan. We have wheat, wine, and flour for Punta Arenas (po͞on′tä ä-rā′näs), situated on the strait, and similar freight for Buenos Aires and Montevideo (mōn-tā-vē-dā′ō).

Everything is carefully packed, for we are about to enter some of the stormiest seas of the world, and what might be called the very home of the winds. About Cape Horn fierce winds blow all the year. There are many storms farther north, and seamen are glad when they reach the strait, where the waters are usually quiet. Moreover, we shall avoid some of the storms by traveling through the

narrow channels, which run in and out among the mountainous islands along the west coast. This is the Smyth Channel route, the scenery of which is wonderfully grand.

We are anxious to be off and are glad when, as evening falls, there is a rattling of chains and the anchor is raised. We hear the thump, thump, thump of the engines, and as we go to bed we are moving out of the smooth waters of Arauco Bay into the ocean.

We awake to find the ship rolling. We have to hold to our berths while we dress, and a lurch of the vessel often sends us against the walls of our rooms. We climb upstairs to the deck, brace ourselves against the rail, and look out over the sea. There are whitecaps everywhere. The waves rise and fall in huge masses. They whip the ship, striking its sides with a noise like a cannon. Now a great billow dashes against the ship, and now a still bigger one splashes over the top deck, flooding everything and making us run to our cabins.

When we sit down at dinner we find the "fiddles" placed on the tables. These are networks of slats which hold the plates, cups, and other dishes so that a lurch of the ship will not send them into our laps. We lift our soup plates halfway to our mouths and balance them with the roll of the vessel, trying at the same time to get our spoons between our lips without spilling the soup. How few of our party have come out to dinner! Many of us are seasick and prefer to stay in bed in our cabins. Even the bravest of us does not care quite so much for his food as he did upon land.

A day or so later we have grown used to the motion and are all upon deck. We enjoy the changes which the rough sea and the storms bring every hour. Now we are shrouded in mist, and every few minutes the fog horn blows to warn

other ships to keep out of our way. Now the fog lifts, and we see high waves rolling about on all sides. There is a break in the clouds, and away off to the east is a faint line of blue. That is the long, narrow island of Chiloë (chē-lō-ā′); the mainland is much farther off. We are fortunate in securing a view, for in Chiloë the natives say it rains six days every week in winter and on the seventh the sky is much overcast. It is better in the summer, but even then the island is half shrouded in mist. As we sail on southward, there is more fog and snow. The sea is still rough, and we cannot safely walk about the deck until we enter the Gulf of Peñas (pā′nyäs), from which we go on into Smyth Channel.

It is only four o'clock when we enter the gulf, but it is already quite dark. We are now so far south that the winter nights begin early, and the electric lights are already turned on. The ship moves gently, and when we go to sleep there is no more motion than when in our own beds at home.

XXIV. IN AND ABOUT THE STRAIT OF MAGELLAN

WE have been moving slowly all night and awake to find the waves gone. We have left the open Pacific and are passing through the series of channels about four hundred miles long which wind in and out among the islands of western Patagonia and will bring us at last to the Strait of Magellan.

The scenes about us are among the grandest of the world. We are sailing in a land of clouds among the peaks of the half-submerged mountains which form the southernmost

part of the great Andean chain. The channel is more like a narrow river than a branch of the ocean. It carries us in and out among rocky, grass-clad islands. On our left, ragged mountains rise almost straight from the water. The shores are green and matted with moss and evergreen trees. Higher up, the green is dusted with snow, and at

At the Strait of Magellan. The glaciers extend down almost to the shore. A combination of sea, forest, mountain, and glacier makes the scenery rival that of Alaska.

the top there is ice. Some of the peaks are half hidden in cloud. Others nearer our vessel stand out bold and clear — great masses of emerald velvet under a lavender sky.

The scene changes as we sail onward. The mountains assume curious shapes, and we imagine pictures in them such as one sometimes sees in the clouds. There is one that looks like the Great Pyramid of Egypt, and here is another that has a striking resemblance to the Sphinx.

Now the hills in front of us appear to be climbing over one another like so many giants playing leapfrog, and farther on they rise in cathedrals and forts of green a thousand feet high.

Now the sun comes out. It has penetrated that deep gorge and turned the black water to silver. It catches the snow which is dusted over the hills, and they are spangled with diamonds. It has touched the ice of that glacier and made it an immense lump of sapphire in a setting of silvery snow. Now the clouds are settling upon the channel and hiding the sun. See, there is a wall of them in front of our vessel. We are sailing into a snow-storm. A half hour later we shall move out into the sun again.

How the sky changes! Now it is blue overhead with fleecy white clouds scattered here and there through it. See those masses of vapor nestling in the velvety laps of the hills and wrapping themselves about the snowy peaks as though to warm them. Here, the clouds seem to rise from the water, making a wall across the channel as high as our ship. There, they come down from the top, and we sail out of the dry air into a mist so thick that we can almost wash our hands in it as we go through.

Again we are out of the clouds. The air is clear. The sun is bathing the hills with its rays. The ferns, moss, and trees shine in their green luxuriance, and the many cascades, some as big as your wrist and others no larger than your finger, are threads and cords and ropes of silver. These waterfalls come from the glaciers and snows on the mountains.

Is it not strange that moss and green trees can grow amid such surroundings? Yes; but it is only the highest peaks that are all snow and ice. The trees are evergreens,

so close together that with snowshoes we might walk on their tops. A bed of moss, waist deep, grows among them, and great ferns, with leaves as long as our arms, extend out and cover every bare, rocky spot. The glaciers of the higher mountains often extend down into the forests almost to the shore, and now and then icebergs break off and fill up the channels. This route is sometimes impossible for ships, and as it is, at times we make our way through fields of glacial ice as clear as crystal, and green rather than white. There is a little iceberg now in front of our ship. It is no bigger than a city lot and not as high as the deck. As the sun catches it, it looks like a great emerald whose top is frosted with silver.

But the machinery is stopping. What is the matter? The captain tells us he is going to rob the berg of some ice for the ship. The sailors are already bending over the rails. One of them has a long rope in his hands with a running noose at its end. Now he gives it a throw. The coil flies out and the noose catches on a horn at one corner of the iceberg. We have heard of lassoing cattle but never before of lassoing an iceberg. Yes, but it is not such a bad way after all. The rope is fastened to a wheel on the deck moved by the steam engine, and as the wheel turns, the rope is rolled up and the ship is drawn to the iceberg.

Now some of the sailors have taken one of the ship's boats and landed upon the ice. They are breaking off the top with crowbars and wrapping chains about the blocks of ice, which the engines of the steamer are raising to the deck by means of a derrick. Some of the blocks weigh several tons, and altogether we take on enough ice to last us the rest of the voyage.

But what are those queer-looking boats making out

from the shore? They look like canoes, and each has a fire in the center, about which are huddling brown-skinned, frowzy-headed men, women, and children. They are almost naked, and the man paddling the front boat wears little more than a vest. The boat behind contains several children who wear no clothes at all.

These people have no home except a canoe in which a fire is always kept smoldering on sods. Although the climate is cold, they go almost naked.

These people are savages who live along the far southern coast of western South America. They belong to a tribe called Alacalufes (ä-lä-kä-lo͞o′fes), and they are not like any Indians of the other parts of our hemisphere. They usually live in their canoes although they sometimes sleep upon land in little wigwams about as high as your waist. They make the wigwams by bending over the branches of small trees and tying them together. They then build a fire in front and crawl into their little houses for the

night. They seldom sleep in the same place for more than a week, for it is much easier to build a new house than to go back home if they have wandered far. The men have bows and arrows to defend themselves. The women, as a rule, do the fishing, using lines without hooks. A little chunk of meat is tied to the end of the line. The fish swallows it and the woman jerks it into her canoe.

The food of these savages is fish, mussels, and now and then a fox, seal, or otter. They are fond of whale meat, and if they can find a dead whale they will feast upon it for weeks. They do not seem to care for fresh meat, for they cut it into pieces and bury it, digging it up for food as long as it lasts. They are fond of tobacco and biscuits, and row about our ship holding out their hands and calling out in shrill voices, "Galleta! Galleta!" and "Tabaco! Tabaco!" the Spanish words for cake and tobacco.

We wonder that they do not take cold. The hills on the shore are covered with snow, and we have on our heaviest garments. There is not enough cloth in the whole crowd below us to make a full suit for a four-year-old child. We pity the poor naked savages and one of us goes to his cabin and gets out a pair of old trousers. He throws them into one of the boats. See, that woman has grabbed them. She evidently does not know what they are for; she is tying them around her neck and fastening the legs over her chest. Until white people came these Indians used no clothes at all. A thick coat of whale oil or seal oil was enough to keep out the cold. Now they sometimes wear such cast-off things as they can get from the steamers, but as a rule go naked.

The Alacalufes do not know the use of money. We try to buy some skins of them but they sneer at the sight of our silver and bank notes. They act differently as we

show them some bright cloths and beads, and when the steward holds up a butcher knife one of the savages is glad to give him two skins in exchange. We ask them to come on board but they are afraid and draw back. They are not friendly to strangers and would kill a white man if they could catch one alone.

On our way farther south we cast anchor night after night, for it is too dangerous to travel by dark. The scenery grows grander until at last we steam through a narrow channel, the mouth of which seems to be blocked by a great island. As we come nearer we see a wide waterway opening beyond, and the captain tells us the island is called Desolation Island and that we are at last in the Strait of Magellan.

Standing at the stern, we look to the west, and off in the distance see massive rocks. They belong to Cape Pilar at the entrance to the strait from the Pacific Ocean. The channel in front of our vessel is the Strait of Magellan. It extends eastward from here for a distance of more than three hundred miles, winding its way in and out between the mainland of Patagonia and the islands of the archipelago of Tierra del Fuego (tyĕr′rä dĕl fwā′gō) until it opens into the Atlantic. In passing through the strait we are at times within a stone's throw of the shore. We sail under great mountains, and in the distance often see the high peaks of Tierra del Fuego and other islands of the archipelago. At the eastern end the passage widens, the land is low, and the waters almost bound the horizon.

The Strait of Magellan is one of the commercial highways of the world, and until the Panama Canal was built it was the shortest way from Europe to the west coast of South America. It was discovered in 1520 by a Portuguese navigator, Ferdinand Magellan, and has been explored by others from time to time.

Magellan passed through the strait from the Atlantic to the Pacific. He crossed that ocean to the Philippine Islands, where he was killed by the natives, and one of his vessels was burned. The other two ships sailed for the Molucca Islands, where they loaded with spices. One of the ships then sailed for Panama and was lost. The other, the *Victoria*, with eighteen men sailed for the Cape of Good Hope and then north to Europe, making the first voyage around the world.

The strait is about three hundred and fifty miles long, varying in width from two to twenty-four miles. It has deep waters all the way, but winds about so that large sailing vessels, on account of the changing winds and the calms, prefer to go around stormy Cape Horn, although this takes them many hundred miles out of their way.

It is different with the steamers. They can move whether the wind blows or not. Some of the vessels crossing the Atlantic between Australia and Europe and those going to and from the east and west coasts of South America still pass through the strait, although many now go by the Panama Canal. There are so many ships which use the strait that a city has grown up here at the tail of the continent to furnish them coal and other supplies. This city is about midway through the strait. It is Punta Arenas, or Sandy Point, and here we shall stay for a time.

XXV. AT THE END OF THE CONTINENT

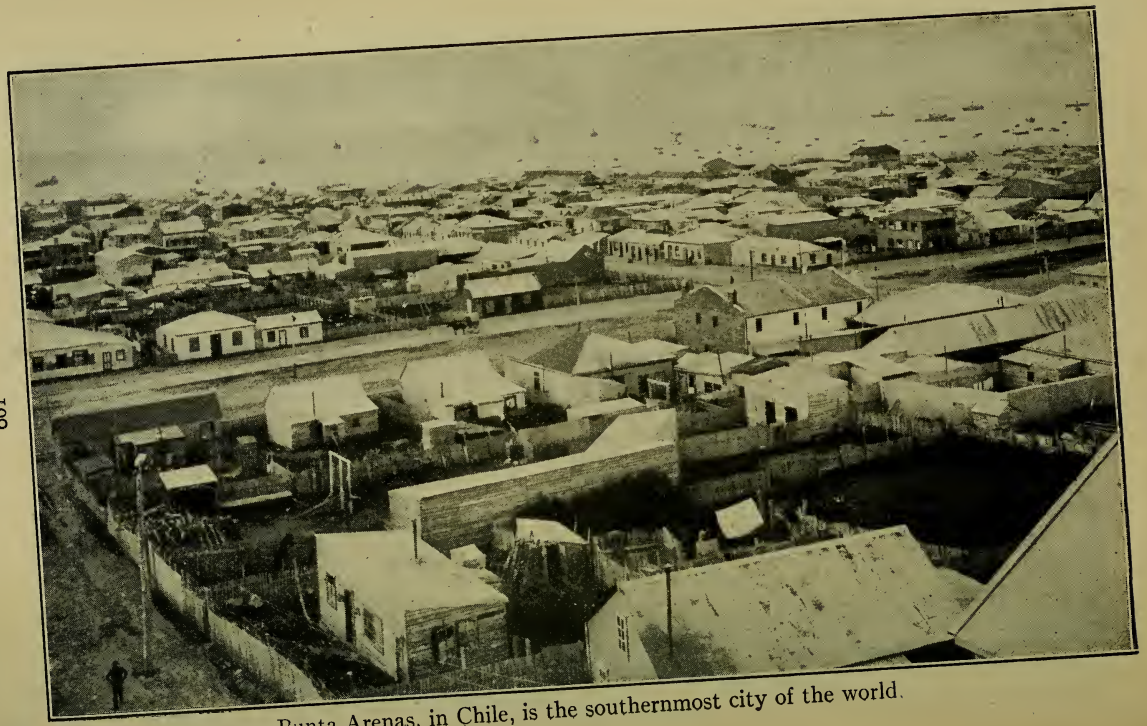
PUNTA ARENAS is the southernmost city of the world. It is more than twelve hundred miles nearer the South Pole than Cape Town in Africa, and it is several thousand miles farther south than any city of Europe or Asia. Its

latitude is 53° south; it is farther from the equator than Winnipeg or Liverpool, and about as far south as Berlin is north of that line. The town is a lonesome one. There is no settlement of any size within a thousand miles of it, and its supplies are brought in by steamers. The reason for its location is its situation where ships can stop to coal and get fresh supplies for the long voyages they have yet to make. Not far from the pier we find great stores of coal and warehouses filled with foodstuffs and there are English and German steamers in the harbor. We come to anchor near a vessel from New Zealand. She has lighters beside her and the men are loading and unloading freight.

We take a small boat to the pier and by a short walk are in the heart of the city. What a queer place it is! The town has been cut out of the forest, and the hills about it are covered with woods. Nevertheless, it has wide, well-paved streets and a beautiful plaza faced by good houses and stores. The town is lighted by electricity and has a cathedral, fine public buildings, and many comfortable houses. We visit the museum to look at the beasts, birds, and reptiles of this far southern country, and in the stores buy some ostrich feathers, guanaco skins, and Indian baskets to take home.

We are interested in the people we meet on the streets. There are many Chileans and also Danes, Norwegians, and Swedes who have a large share in the navigation of the strait. There are English and others who have come here to raise sheep, and we are told that the land is so good for this purpose that many million pounds of wool are exported each year.

During our stay we make a tour through the archipelago of Tierra del Fuego, which borders the southern end of South America. It is composed of hundreds of wooded



Punta Arenas, in Chile, is the southernmost city of the world.

islands which look very small on the map. Most of them are small, but all together they contain nearly as much land as Maine; and Tierra del Fuego, the largest, is almost equal to West Virginia in size.

Tierra del Fuego belongs to both Chile and Argentina, the boundary running north and south through it. The island lies just across the strait from Punta Arenas, and steamers go there almost every day. We take passage upon one for Port Venir and from there make excursions by boat and on horseback.

The island has a rim of mountains around the greater part of it. The mountains rise almost straight from the water, and huge glaciers hang down from them, now and then breaking off and falling into the sea with a terrible noise. The scenery is grand but the waters are rough and we have to move slowly.

As we near the shore we see men here and there washing the sands for gold, and are told that in time of storms gold grains and small nuggets are frequently thrown up on the beach. Some of the nuggets are as big as marrowfat peas. This gold comes from ledges found near the shores of some parts of the island. The miners go out upon the beach at low tide and gather the sand which they wash for the gold. Gold, coal, and copper are found on the mainland not far from Punta Arenas. Balboa found gold in the Andes near Panama, and it is mined here and there in the whole length of that range, even to the Strait of Magellan.

The vegetation of Tierra del Fuego surprises us. We are so far south that it seems that the country in winter should be covered with snow. It is not. The climate is much like that of Scotland. It is only on the tops of the mountains that the snow remains all the year, and the glaciers moving down their slopes are bedded in green.

For a thousand feet up from the water the land is so covered with trees, ferns, and moss that we can hardly make our way through, and some of the trees are as big as those of the tropics. The island has beeches eighty or ninety feet high and two yards in thickness. It has hardwood trees somewhat like those of our central states. Much of the forest is of evergreen trees, and the grass is green the year around.

In the interior of the island we shall find great plains spotted with wild flowers. There are wild gooseberries, raspberries, and strawberries, and also wild grapes and wild celery. The farmers raise cabbages, potatoes, turnips, and peas. The pasture is so rich that the sheep are easily fattened. The mild climate is caused by the warm winds from the ocean.

We have to ride carefully as we make our way inland. The land is often swampy, and we guide our horses this way and that to avoid the homes of the rats. Ground rats are the chief pests of Tierra del Fuego. They burrow through the earth and fill it with holes like those of a prairie dog town. They destroy the pastures and eat so much grass that the shepherds wage war upon them by driving herds of cattle over their burrows, thus trampling them to death in their homes.

We stop some days with the sheep farmers. The sheep are kept in flocks of one or two thousand and are watched by shepherds on horseback. Each shepherd has dogs to help him. Most of the dogs are Scotch collies which seem to understand the motions of their masters almost as well as we understand language. A certain motion will send a dog to the front, another will bring him to the rear, and when the man raises his hand into the air the dog stops short. The shepherd can direct his dogs to the right

The Ona Indians of Tierra del Fuego are tall and fine looking. They use bows and arrows and wear guanaco skins.

or to the left, and, in fact, make them drive the sheep in any direction he pleases.

The sheep of this part of the world are not fed in winter from barns or haystacks. The grass keeps green all the year, and the only dangers are that the sheep may get lost, be stolen by the Indians, or eaten by wild beasts or vultures. The sheep are often so fat and heavy that when one falls into a hollow and rolls over on its back it cannot get up. It lies there kicking, and the vultures sweep down upon it and pick out its eyes. The vultures seem to understand that a blind sheep is helpless, and they keep on picking until it dies. After that they tear off the skin and eat every bit of meat from the bones. It is the duty of the men to be on hand when a sheep falls and help it to its feet again.

We are interested in the Indians of Tierra del Fuego. The island has fierce savages called Onas who for a long time waged war with the shepherds. The Onas are among the finest-looking of the Indian race. The men are about six feet tall, and the women almost that height. They have high cheekbones, flat noses, and dark eyes. Their hair is black and straight. The men singe their heads close to the crown, and the women let their hair grow so that it hangs over their shoulders. The Onas wear but little clothing except guanaco skins wrapped about their bodies. They live on the land but have no fixed homes. They do not like to stay more than a night or two in the same place, for they have an idea that evil spirits are after them and that they must move on. When they stop they merely make a hole in the ground about three feet deep and weave branches over it. They then crawl in for the night and cuddle together with their dogs about them for warmth. The chief weapons of the Onas are bows and arrows, and they get their food by hunting and trapping.

Another Indian tribe is the Yaghans (yä′gäns). It is largely confined to the southern part of the island. These Indians are much like the Onas except that they get their living from the sea rather than from the land. They eat fish, birds, fungi, oysters, and clams. They cook birds by putting red hot stones inside them and placing them on the coals. They roast eggs by standing them upright in the ashes before the fire, first breaking a hole in each egg to let the steam out. The men are good hunters and the women excellent fishers, being more fearless than the men in swimming and in the management of their boats.

1. Where are the forests of Chile? Why? Where are the great forests of the United States?

2. Why has southern Chile a great leather industry?

3. Describe our visit to the coal mines. Compare it with a trip through a Pennsylvania coal mine. (See Carpenter's "North America.") Near what port are the Chilean mines? Mention three other important ports of south Chile.

4. Find Cape Horn on the map. What is the Strait of Magellan? How was it discovered? Find out all you can about Magellan and the first voyage around the world.

5. What is the southernmost town of the world? The northernmost? Compare their distances from the poles.

6. Describe our trip through the Strait of Magellan. Compare its climate with that of Scotland. (See Carpenter's "Europe.")

7. What great island is at the southern end of South America? To what countries does it belong? Describe it. What is its chief industry?

8. Who are the Araucanians? Compare them with the Indians of Peru, of Bolivia, and of North America. Describe the Alacalufes, the Onas, and the Yaghans.

XXVI. ARGENTINA — PATAGONIA

THIS morning we are again in Punta Arenas, ready to start north on the eastern side of the continent. We shall make our way through Patagonia, which is the name given to southern Argentina. Argentina is one of the richest and most healthful countries of South America. It has a vast territory. It is greater than all our states east of the Mississippi River. It extends from north to south through thirty-four degrees of latitude, farther than the distance between the north side of Hudson Bay and the Gulf of Mexico, and therefore has many different climates and products. In the warm north sugar cane, coconuts, and oranges grow. The central provinces are temperate

and are covered with wheat fields and pastures, while those of the far south are almost a desert with a climate comparatively cold. There sheep are fed on the sparse vegetation and the rivers furnish the water for some irrigated tracts.

Most of Argentina is flat, and railways can be built at comparatively low cost. The country already has nearly one tenth as much railway mileage as the United States. It has more trunk lines than any other South American republic, and it is rapidly increasing this means of transportation. There are many great plains called pampas upon which one may travel hundreds of miles without seeing a hill. There are only a few low mountain ranges, with the high wall of the Andes in the west.

Only a small part of Argentina is settled. In this respect the country is as the United States was many years ago. The population is now about as great as that of New York State, and is rapidly increasing. Immigrants from Europe are coming to work in the cities or to raise wheat, cattle, and sheep in the country. So many people have recently come that already every third man is a foreigner. Most of the immigrants are from Italy and Spain, although there are some Russians, Syrians, English, Germans, and French. Many Italians come over to work for the summer, when Italy has its winter, going back home as the Italian spring comes. Argentina is glad to have immigrants. It gives them lands at low prices, and it has established free hotels at the seaports and in the interior, where they may stay on their way to their new homes. Many of the immigrants live in Patagonia, and we shall see some of them on our way north.

Patagonia is the name formerly used for the whole southern end of the South American continent, extending from the Strait of Magellan to about forty degrees of south lati-

tude. It once included southern Chile and southern Argentina, but the name now applies only to the part east of the Andes. This will form the next scene of our travels. A coasting ship takes us from Punta Arenas around Cape Virgin on the eastern side of the strait, and we make our way along the coast, calling at Santa Cruz, Rawson, and other ports where we take on wool, and now and then stop for a short run into the interior.

How bleak and bare everything is! The water-laden winds come from the Pacific, and have dropped their rains in Chile west of the Andes. When they reach Patagonia they are dry and the whole country seems nothing but sand. There are no trees to speak of. The only green fields are in the river valleys where the land has been irrigated and in the west along the foothills of the Andes. The valleys have many orchards and vineyards, the latter producing thousands of gallons of wine every year. In the Chubut (choo̲-boo̲t′) province are millions of sheep, cattle, and horses, and in Santa Cruz, still farther south, about fifty million pounds of wool are sold in one year. At some of the ports mutton is being frozen for shipment to Europe. In this part of Argentina many of the farmers are Welshmen. They are very thrifty and the towns are well-kept. A little later we are again on the sea, going north, and now we are sailing up the deep but narrow harbor of Bahia Blanca, on the edge of a more fertile part of the country.

Bahia Blanca is the chief port of Argentina on the Atlantic. Buenos Aires is much larger, but it is on the Rio de la Plata River, more than one hundred miles from the ocean. Bahia Blanca is right on the sea, and has great elevators for the storing of grain, and the best of shipping arrangements. It has a good harbor with deep water at all times, and it is accessible to all parts of the country by railway.

A railroad has been built from here over the desert pampas to the foot of the Andes. It will cross the Andes to Chile by a low pass and end at the port of Valdivia on the Pacific. This will be a shorter route from ocean to ocean than the Transandine railroad farther north.

A guanaco. Among native South American animals, the llama, vicuña, alpaca, and guanaco take the place of cattle, sheep, and deer.

Let us take this railroad and ride over the dry pampas to the beautiful lake of Nahuel Huapi (nä-wĕl′ wä-pē′) at the foot of the Andes, stopping now and then on the way. What a curious region it is! We go for miles seeing nothing but sand with thorny, scrubby bushes growing here and there. There is but little grass, — so little, indeed, that it takes from three to five acres to furnish food for one sheep. It reminds us of the sage-brush country of our western highlands.

How wild everything is! There is not a fence to be seen. There are no barns, no roads, no farms, nor anything living. There is nothing but thorn bushes and sand. But stop! What are those yellow animals galloping away to the right? There must be fifty of them. They look like miniature

camels. They are bigger than sheep and more beautiful than llamas. See how queerly they run. Their gait is more like short jumps than a gallop. What are they? They are guanacos, animals of the same family as the llama, only wild and not quite so large. They are hard to shoot, for they have a keen sense of smell and can scent a hunter a full mile away. Guanaco flesh tastes much like venison and is delicious when roasted over the coals. The fur is of a tawny yellow spotted with white; three or four skins sewed together make a beautiful rug.

Now we have left the guanacos far in the rear. We are again surrounded by nothing but thorn bushes and sand, with hundreds of spots of white far off to the right. The white spots are moving. They are sheep, and that little brown figure running here and there among them is their shepherd on horseback. He is so far off that he looks like a pygmy, and his horse looks the size of a dog.

But what are those gray birds swimming through the air over the plains? They are coming toward us. That is a flock of rheas or South American ostriches. Their wings are outstretched, and they hold their heads far in front of them. They fairly skim over the ground, their long legs kicking up a dust as they go. Some of them run very fast. There is one which has started up out of the bushes and is racing our train. We are going at a speed of forty miles an hour. The ostrich keeps up with us a few minutes and then drops behind.

There are many wild ostriches through this whole region, and had we time we might capture one. The proper way to catch them is by means of a bola, a long string of tough leather with an iron ball as big as your fist at each end. The hunter rides after the ostrich on horseback and when he gets near enough, throws the bola so that the string

wraps itself around the legs of the bird, which falls to the ground.

Ostriches are not easy to catch. When hunted they often squat down and hide their heads in the sand. Many people who have not seen these birds in their homes think this foolish, but on the desert there could be nothing more cunning. The feathers of the ostrich are of much the same color as the bushes of the pampas, and when one of them hides his head he looks like a gray bush, and the hunter may ride by without noticing him.

The South American ostrich is a distant cousin of the African bird. His plumage is of little value.

These ostriches are not like those of Africa which furnish the fine feathers our mothers use in their hats. Many of the African ostriches are found wild in the Sahara desert, and they are reared on the farms of South Africa. The rhea is much smaller and its feathers are coarser. The feathers are used to make dusters, and rugs are made of the breasts of the young

birds. Would it not be fine if we could each take home a rug of ostrich breasts?

But here we are at a station. What a lonesome place for a town! And such a town! The half dozen houses are gray, one-story structures built of sheet iron imported from the United States. The station itself is of iron, and that water tank there stands upon a framework of the same metal. The windmill above the tank came from Chicago.

The men on the platform are fierce-looking fellows with bright-colored ponchos over their shoulders. They are gauchos, or Argentine cowboys, who herd the cattle and now and then work for the sheep farmers at shearing time. We shall see more of them farther north.

Now we are again on the desert. We have left the cars for a time and are alone on plains as dry as the coast of Peru. Our cheeks burn and our lips crack under the hot sun in the clear, thirsty air.

What is that cloud coming up? That surely is the sign of a storm! Hear the wind! It is blowing with the force of a blizzard and driving the cloud toward us. Yes, this is a storm, but not a rainstorm. The cloud is now between us and the sun, which has become a great round red ball instead of the fiery white furnace it was a moment ago. The cloud is not water. It is dust and sand. We are in the midst of one of the sandstorms of the pampas. Our guide drags us down into a hole he finds in the desert and draws our blankets over the top.

Soon the storm is upon us. The sand comes down like fine hail. It sifts through the blankets and we close our eyes. Now it is over, and we find we have a heavy load to raise when we push back the blankets. How queer we look! We thought we were white, but the sand which has drifted through the blankets has turned us brown. Our

nostrils, ears, and mouths are filled with dust, and our clothes are covered with sand.

Such storms are common on the pampas of southern Argentina. The dust is as fine as flour. It comes in great clouds, and in the cities it covers the houses. It creeps through every crack and crevice, closed doors and windows being no protection. The dust goes with the wind and is often followed by a drenching rain. This wets the dust in the air and for a time it really rains mud. If the rain does not last long the houses are covered with mud, and it is only when the rain is heavy that they are washed clean. These storms sometimes stop the railroad trains, steam plows like our snow plows being used to keep the tracks clear.

XXVII. IN ARGENTINA — LIFE ON THE PAMPAS

A LONG ride by train has brought us back to Bahia Blanca. Here we again take the railroad and are soon traveling through some of the great pasture lands of the world. Some parts of the country are fenced with barbed wire, but most of it is just as nature made it — vast pampas which extend on and on until they lose themselves in the sky.

Now we see a flock of two thousand sheep browsing on the rich grass. Their white wool shines among the dark-green bushes. We hear the baa, baa of the lambs and the coarser voices of the old sheep as we go by.

Over there on the horizon is a drove of horses, mere brown specks against the blue sky, and between us and them a long train of huge carts, each hauled by eight oxen, is drag-

Argentina ranks third among the sheep-growing countries of the world. Sheep are counted as they pass through a gap in the fence.

ging its weary way over the plains. Those carts are filled with wool or hides, and the men walking beside them are driving the teams to the station.

In these pastures is found the chief wealth of Argentina. The country has many million head of live stock. It has so many that if they were divided equally among the people, each family would have fifty sheep, twenty cows, five horses, and seven or eight hogs. We might travel back and forth across the republic and, with the exception of the rude huts of the herdsmen and now and then the larger buildings of some rich farmer, see little else than great flocks of sheep and droves of cattle and horses.

Argentina ranks third among the sheep-growing countries of the world. The sheep are watched by shepherds on horseback. They can feed out of doors all the year round, for the climate is mild and there is good grass in all seasons.

We see very few barns and haystacks as we ride over the pampas. The farmers seldom raise hay or corn for their stock. It is necessary only to let the animals graze and give them some salt now and then. The sheep must be watched on account of the vultures.

The shearing is done once a year, sometimes by hand and sometimes by machinery. The wool is cut off and put in bales much as we bale cotton. It is then shipped to Bahia Blanca or Buenos Aires and there transferred to steamers for Europe or the United States. Much of the wool goes to Boston, and is woven to cloth in the woolen mills of New England.

For a long time the sheep of Argentina were reared for their wool only. The home demand for mutton was small, and in the city chops cost only a few cents a pound. Now mutton is exported by the shipload to Europe, and there are great factories at Buenos Aires and even as far south

as the Strait of Magellan which freeze it for export. In these factories the sheep are killed and dressed, and then hung in rooms which are made so cold by certain chemical processes that the meat soon freezes stiff. In this state it will keep. It is then wrapped in white cloth and carried to the refrigerators of the steamers which take it to Europe. As soon as it lands there it is thawed and placed on the butchers' counters for sale. It then looks like freshly killed meat and when cooked tastes like fresh mutton. Beef, as we shall see later, is exported in the same way.

But let us leave the train and ride on horseback over the pampas. Here we are at the home of a shepherd. How rude it is! It is a hut made of poles covered with mud, and its roof is of straw thatch. We have to stoop to enter the door, and we look about in vain for chairs for our party. The hut is scantily furnished.

Much of the cooking is done on the ground outside. The oven is that round mound of mud which looks like a beehive.

The shepherd lives with his little family all alone here, away out on the plain. He spends the day riding about among the sheep, and at night drives them into that corral near the hut. He works for a rich farmer who owns thousands of acres of land and more than one hundred thousand sheep. He tells us that the estate, or estancia (es-tän′syä), is so large that we might ride all day in one direction and not come to its end. We learn later that much of the land of Argentina is in large tracts. Land is not sold by the acre, but by the square league, one of which contains nearly six thousand acres.

But suppose we go farther over the pampas. We gallop for miles, now riding where the turf is soft, fresh, and green, and now where the grass is gray, dead, and coarse. This is the natural grass of the pampas. The green turf has been pastured year after year. When so treated the coarse grass disappears and a more tender and richer grass springs up.

But see that smoke away off to the right. The flames are rolling up from the earth and dense white clouds are blowing toward us. Is that a prairie fire away down here on the pampas? Don't be alarmed. The men who have lighted the fire have burned a strip around their fields so that the fire will not go beyond them. They are burning off the coarse grass and thorn bushes, after which a better vegetation will come. The owners say it improves the land to burn it over once every few years.

We have now left the sheep farm and are passing through one devoted to cattle and horses. It is far away from the cities and in one of the least developed parts of the country. The estancia is a large one, and we might ride eighty miles

Cattle, formerly raised in Argentina for their hides only, are now used for beef and milk.

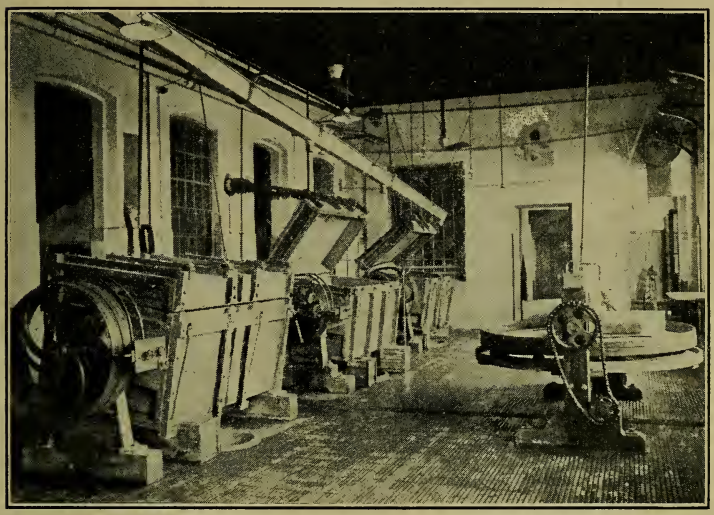
in a straight line and not get across it. It has great droves of cattle and thousands of horses. See, they are branding the animals. They have driven the horses into an inclosure fenced by stakes. Now they have caught one with a lasso. They are driving him about in a circle. Now he is tired and they pull him down to the ground. One man sits on his head and another holds him tight by a rope fastened about his front legs, while a third seizes a hot iron from a fire near by and burns a mark on his side. That brand is the mark of the owner, and by it he can claim the horse if it gets lost.

In the past, droves of wild horses grazed on the pampas. There were so many that they were killed for their hides and tallow, and one could often see horse hides tied to stakes and left in the sun to dry. The animals then sold for a few dollars, and each and every native owned one or more. Now Argentina has taken to breeding fine horses, and it has some of the best of all South America. Every spring there are horse sales near Buenos Aires which bring several million dollars, and where a single animal will sell for several thousand dollars. Draft and race horses are exported to England, and racing is one of the chief sports of the Argentines.

The cattle have been greatly improved, and to-day Argentina stands forth among the cattle-growing countries of the world. In no part of our country have we finer animals than are reared on these large farms. Not long ago a Shorthorn bull was sold in Buenos Aires for forty-five thousand dollars, and Hereford calves have sold for as much as two thousand dollars. A great dairy business is fast growing up, and outside Buenos Aires are dairies with steam churns, each of which will make five hundred pounds of butter an hour.

Horses in Argentina are raised largely for their hides.

Rearing cattle for their meat has become a great industry, and there are large packing houses at Bahia Blanca, Buenos Aires, and other places where thousands of beeves are killed daily and exported in cold storage ships to Great Britain and the United States. These establishments are called frigerificos, or freezing establishments. Some of the largest



Churns run by electricity, which make five hundred pounds of butter an hour.

of them belong to American capitalists and are associated with our chief packing companies at Chicago.

During our visits to the stock farms we go about with the gauchos who attend to the cattle, riding on horseback with them for miles over the great fields. They are different from the laborers on the west coast of South America, although they are dark-faced and many of them have

Indian blood in their veins. What a queer dress they wear! Instead of trousers they have white drawers which are sometimes tucked into their high boots and sometimes drawn down over them, being edged with lace. They have blankets around their waists, the ends of which are drawn through between the legs and fastened to their belts. Most of them wear slouch hats. Each man carries a whip, and all have knives in their belts. These gauchos are the descendants of the mixed breed of Spaniards and Indians. They are the cowboys of the pampas and like only such work as can be done upon horseback and in riding over the plains watching the cattle and horses.

As we ride over the pampas we visit one of their houses. It is a mud hut only fifteen feet square, and the door is so low that we have to stoop to enter. The earth is the floor, and those dry bullock skulls scattered about are the seats. A rude table, a box, and a chair comprise the rest of the furniture.

The cooking is done on a fire outside the door. The chief food is beef roasted upon a spit over the coals. As the meat cooks, the gaucho's wife bastes it with the juice, which she catches in a pan as it falls. When done, the meat is cut off in large slices and eaten without plates or forks. Each one takes a slice in his hand, puts one end of it between his teeth, and, pulling out the slice as far as he can, draws his knife across it within a sixteenth of an inch of his nose. When his first bite is chewed, he takes another in the same way, so that he really has no need of a fork.

A favorite dish is carne concuero (cär′nā cōn-kwā′rō), which means meat cooked in the skin. The meat is cut from the animal with the skin upon it. It is wrapped up tightly so that the skin keeps in the juices when roasted over the coals.

1. Between what latitudes lies the republic of Argentina? If the country were laid upon North America with Tierra del Fuego at Florida, where would the northern boundary be? What South American republic has the most railways?

2. Compare Argentina with the United States in size and climate; with Brazil. Why is it warm in the southern part of our country and cold in the southern part of Argentina? What season have we now in the United States? What season has Argentina?

3. Locate Patagonia. Why is Patagonia so dry and southern Chile so wet? What are the products of the two regions?

4. What is the chief Atlantic port of Argentina? Why has Buenos Aires become larger?

5. What is the difference between the guanaco and the llama? The rhea and the African ostrich? (See Carpenter's "How the World is Clothed," chapter 32 and Carpenter's "Africa," chapter 44.) Why is the ostrich wise to hide its head in the sand?

6. Compare the pampas with our prairies.

7. Compare Argentina with the other wool-growing countries of the world. (See Table IX.) (See Carpenter's "How the World is Clothed," chapter 10.) Describe a sheep farm. Trace a shipload of wool from Bahia Blanca to Boston; from Sidney, Australia, to New York.

8. Name the great cattle countries of the world. (See Table VIII.) Show the place of Argentina among them.

9. Who are the gauchos? How do they live?

XXVIII. THE BREAD LANDS OF SOUTH AMERICA

WE shall travel to-day through some of the chief food lands of the world. Argentina grows almost all kinds of crops, and we can describe only a few of them. A large part of the country has corn fields almost as good as our own, and it has single fields of alfalfa that contain more than one thousand acres. Alfalfa is used to fatten beef for export, and in that respect largely takes the place that corn

holds in our country. Argentina is one of the chief wheat lands of the world, and as we shall see later, it sends wool by the shipload to the United States and Europe. It has also in the northern province of Tucuman a region much like Florida and Georgia in climate. The cotton and sugar lands are in the northern part of the republic, and we shall visit them next.

We take cars at Buenos Aires and ride for two days through the rich farms along the Paraná River. We travel through wheat and corn fields and pastures. The weather grows warmer as we proceed, and at last we enter a country where there are oranges, lemons, and other tropical fruits. We are now in Tucuman (to͞o-ko͞o-män′).

How different from the desert north of Punta Arenas! All nature is green, for the soil is fertile and there is plenty of rain. We pass groves of tall palm trees, their green fan-like leaves rustling in the wind. We visit sugar plantations where gangs of men and women are cutting the cane. They chop it off close to the ground and load it on ox carts to be hauled to the factory. We follow a cart and watch the cane stalks as they are thrown between steel rollers which squeeze out the juice, and farther on we see the juice boiled down into sugar.

We are surrounded by mountains. There are streams everywhere. Some are almost dry now, for it is winter. In summer the rain comes down in great sheets and turns the streams to torrents. We can see how they have cut deep gorges here and there through the hills. They often flood large tracts of land.

More hills come into view as we leave Tucuman and go westward and southward. We are in the foothills of the Andes. There are forests of fine woods, and farther south we enter a land of great vineyards.

See how the vines cover the hills. They extend on and on for miles. The western part of Argentina is a rich grape-raising country. Trainloads of grapes are shipped from here to Buenos Aires and other parts of the republic. Some go even as far as the United States. When the grapes are ripe, men, women, and children walk through the vineyards gathering them in baskets and carrying them to the wine presses.

Look up at the mountains to the west. Those are the snow-capped Andes. This town into which we are coming is Mendoza (mĕn-dō'sä), the metropolis of the grape-growing section, and that snowy peak just beyond is Mount Aconcagua. We saw it before in Chile. Mendoza is a station on the Transandine railroad. That iron track which climbs the mountains is the eastern part of the railway, over the western part of which we had such a pleasant journey in Chile some weeks ago.

There is a good railroad from here to Buenos Aires, and one can travel in comfortable cars to almost any part of the republic. We decide to go back to the wheat lands by the way of Cordoba (kôr'dō̤-vä) and stop there for a few hours on the way.

Have you ever heard of Cordoba? It is a town well known in the history of South America. It was for two hundred years one of the chief centers of education and culture, and it had a university seven years before our Pilgrim fathers landed on Plymouth Rock. Cordoba has a large university now. It is also a business center and has all modern city improvements, including electric street cars and lights run by the power from the Rio Primero (prē̤-mā'rō) near by. A stay here will give us some idea of a small city of Argentina.

We take a motor-car at the station and drive to the plaza,

which is in the center of the town. Cordoba is much like the cities of Chile in that it is laid out in blocks with its streets crossing one another at right angles. The blocks surround the plaza, or public square. Almost all the houses are of one story. They are painted in the brightest of colors, and many have iron bars over their windows, making us think of a jail.

Back of these bars we see women and girls standing or sitting. It seems as though the girls were caged in. This is so in almost all towns of Argentina. Young women and girls seldom go alone on the streets. They are not allowed to associate with young men or boys until they are married, and the young man who would stop at a window and chat would be told to move on.

We drive through the wide Avenida General Paz, admiring the statues at its ends, and then out among the shabby huts of the suburbs where the poor people live.

Here all is dirty and squalid, but the sky is bright blue, and the gorgeous sunlight gives an atmosphere like that of the Orient. The outskirts of Cordoba remind travelers of Cairo; and the Moorish architecture of the churches and of the better class houses is like that of southern Spain.

Now we are again in the city. What queer names for streets. Some are taken from the noted days of the history of Argentina. Here is one called Twenty-fifth of May Street. We turn the corner and go into the street of the Eighteenth of July, and wonder if we shall not find farther on a street named "Week after Next."

We stop at the market. It is in a hollow square surrounded by rose-colored, one-story buildings containing meat stalls. The red beef and mutton hang from hooks under white awnings. There are no scales. Those women

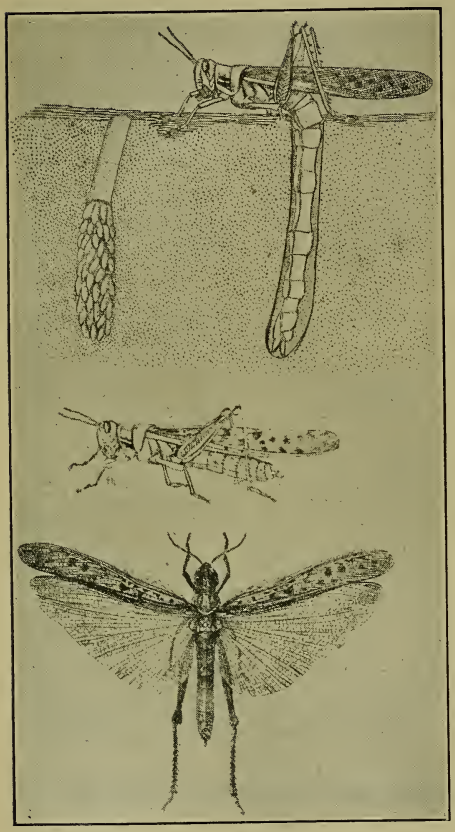
with the black shawls around their heads who are buying pay for the meat by the chunk. The court is filled with carts which have come in from the farms. On the ground sit dark-faced women with vegetables about them, which they sell by the pile.

What is that squealing outside the market? It sounds like a pig in the hands of a butcher. They surely cannot kill hogs here in the midst of the city. It is only the creaking of a farm cart which is bringing in wheat. There it comes through the door. It has wheels eight feet in height, hubs as big around as your waist, and an axle as thick as a telegraph pole.

But let us leave Cordoba and ride on the railroad into the wheat lands. We reach them within a few hours. The best wheat region of Argentina lies in the Paraná basin within a hundred miles of both banks of the river, for the soil which it has brought down from the uplands is exceedingly rich. The wheat lands are so large that if they could be put into one block they would cover an area five times that of New York, or six times that of Ohio. This tract in good seasons produces far more wheat than the people can use, the wheat exports often competing with our wheat in the markets of Europe. Indeed, our farmers might have to stop exporting wheat, did not Argentina have many droughts when the wheat will not grow, and in wet seasons occasional invasions of locusts, or short-horned grasshoppers, which eat the crops.

The locusts are not like any we have in our country. They come down in swarms of millions from the warm lands of southern Brazil. There are so many of them at times that they shut out the sun like a storm cloud. They alight on everything green and consume all as they go. They eat the leaves of the trees and also the fruit. They are

especially fond of green wheat. A swarm of locusts will chew up a wheat field in a night, and when they come in vast numbers, as they sometimes do year after year, the farmers are ruined. The locusts lay their eggs in holes in the ground, and when these eggs hatch there are thousands more. The people never know when they are coming, and plant on and on, hoping to be able to harvest their crops. We pity the people as we watch them at work.



Argentine locusts. "Each lays from fifty to one hundred eggs."

It is now spring, and they are plowing the fields. We ride for hours through vast tracts of brown soil, upon which dark-faced men are guiding their oxen this way and that through the furrows. Here one is sowing the seed, scattering it by hand, and in the next field oxen are dragging harrows and brush over the clods

to cover the grain. A little later we pass through a great estate where farm tractors are used.

Now we are passing farms where the wheat has been sown for some time. As far as we can see there is nothing but the emerald green of the fresh sprouting grain. A little later, as harvest time comes, this vast sea of emerald will change to billows of gold. There will be wheat on all sides,

Hauling wool to the station.

and the yellow waves will roll on and on, until at last they lose themselves in the blue sky.

Then there will be reapers and mowers moving over the fields, some drawn by horses or oxen and others by tractors, cutting the grain. There will be steam threshers puffing away as they shell out the wheat, and there will be huge ox carts like those we saw in Cordoba, with teams of eight or twelve oxen, and now and then a motor-truck, hauling the great loads of bags to the train.

Were we here at that time we might find it very slow

traveling. There is so much wheat that all the freight cars of the country are needed to carry it to Rosario (rō-sä′rē-ō), the chief wheat port of the Paraná River, and to Buenos Aires or Bahia Blanca for shipment to Europe. The tracks are so crowded with wheat that the passenger trains are sometimes kept back to let the freight cars go by. At that time there are stacks of bags at the stations awaiting shipment, many of them being covered with canvas to protect the wheat from the rain.

Why do not the farmers store the wheat as we do? We can easily tell as we ride on through the fields. There are no barns anywhere! Lumber is costly, for most of the building materials come from our country or Europe. No feed is stored, and even the working horses and oxen are often turned out to graze. The chief farm buildings are the little mud huts thatched with straw in which the men live. The result is that the grain is sold as soon as it is threshed, and the farmer must take what he can get. Recently, elevators have been constructed at the chief ports, and in time they will be found everywhere.

Most of the grain is shipped to Europe soon after harvest. This is in January and February, which is summer here south of the equator, although it is midwinter at home. There is so much wheat, however, that some is exported all the year round. The chief grain exporting ports are Bahia Blanca, Buenos Aires, and Rosario. We can see one way in which it is handled by watching the loading of steamers at Rosario.

Rosario is situated on the south bank of the Paraná River about three hundred miles by water from Buenos Aires. It is about the same size as Kansas City. The river is so deep here that ocean steamers can pass through the Rio de la Plata and the Paraná up to it. The city is built upon a

bluff so high that it is above the masts of the steamers on the river below. All along the river, a little back from the edge of the bluff, warehouses of gray galvanized iron have been constructed. In these the wheat is stored as it is brought from the fields. In front of each warehouse there is

Beef carcasses being frozen for shipment to Europe and the United States.

a long chute or trough, made of wood or iron, extending down to the water. These troughs are in sections so that they can be shortened or lengthened at will. When connected they make a continuous chute, running from the bluff into the hold of the steamer. The bags of wheat are carried from the warehouses and thrown into the chute. They

bounce up and down as they slide into the steamer, making us think of an army of gigantic yellow mice galloping into the hold. At some places the railroad tracks run so close to the bluff that the wheat bags can be taken from the cars directly to the chutes.

In good years there is grown in all the countries of the globe almost four billion bushels of wheat, of which the Argentine republic produces about one twenty-fifth. The other great wheat countries are the United States, Russia, France, India, Canada, Italy, and Australia. Of the continents, Europe produces by far the most, North America coming next with about one half as much. Most of the wheat of South America is grown in Argentina, the remainder coming from Chile and Uruguay.

A great deal of corn is now being planted, especially in the region between the Uruguay and Paraná rivers. The land is rich and the climate well suited to the crop. Indeed, the day may come when Argentina will have its corn belt, and its people will raise pigs and export pork as they now export beef.

Another important crop of Argentina is flax, the plant from whose fibers linen is made. From flaxseed comes the linseed oil used to mix with paint, and the oil cake used for stock feed. The four great flax regions are Russia, India, Argentina, and central North America. Russia produces most of the flax used for its fibers, while that of Argentina and our country is raised chiefly for the seeds. One reason for this is that in Argentina and the United States labor costs a great deal, and much work is needed to separate the fibers for linen. Argentina raises more flax seed than any other country of the world. Its best flax fields are in Entre Rios (ĕn′trā rē′ōs), the province lying between the Uruguay and Paraguay rivers.

XXIX. BUENOS AIRES

IT is a night's ride by train from Rosario to Buenos Aires. We go to bed in the sleeper as the cars move out of the station, and when we awake we are in the capital of Argentina. We step into a railroad station almost as large as our best stations at home, and walk under a long, glass-covered roof to the front door. How many taxicabs there are, and how their drivers yell at us as we come down the steps! We choose one and are soon dashing through one long street after another, almost skidding as we round corner after corner, until we reach our hotel.

We soon see that Buenos Aires is a large city, and its size grows upon us as we ride through it day after day. It is the largest city on the South American continent, and there are but few in North America surpassing it in size. It is now nearly as large as Philadelphia, and is growing rapidly. It is the chief city of the Paraná basin, and is like Chicago in that it is the commercial and exporting center of its vast bread lands and pastures.

Buenos Aires is situated on the Rio de la Plata about one hundred miles from the sea, at just the point where the great steamers from the United States and Europe can most easily land their goods, and from where the wool, hides, meats, and other products can be loaded to go across the ocean. It is about six thousand miles from New York by sea and the ships make the voyage in three or four weeks. The trip may be made in less time by going to Valparaiso by rail, a distance of 888 miles, and then going north via the Panama Canal.

The port of Buenos Aires is the largest in all South America, and its harbor is lined with magnificent docks equipped with loading machinery run by electricity. Near

Buenos Aires is the Paris of South America — a city of magnificent avenues and fine buildings.

by are huge grain elevators and flour mills, one of which cost fifteen million dollars.

It is in Buenos Aires that the most of the business of Argentina is done. It is the capital, and it has also the chief factories that supply the country with goods. It ships most of the wool and other exports, and has one of the largest produce markets in the world.

The richest people of Argentina live in Buenos Aires. They have magnificent homes, going only now and then to their vast estates in the country. Here also are the business houses of the great merchants, the chief colleges, the great daily newspapers, the finest churches, and nearly everything which is of importance to the republic, except the resources from which its wealth is derived.

But to what races do the people of this great city belong? As we hear them talk we think them all Spanish. There are Spanish signs over the stores, and many speak nothing else. Buenos Aires is by far the largest Spanish-speaking city of the world; it is more than three times the size of Madrid, the largest city of Spain. Still, the most of its people are foreigners. Not more than one fifth of them were born in the country. There are more Italians than native Argentines in Buenos Aires, and at least one hundred thousand of its citizens have come here from Spain.

Those masons who are building that house over the way are Italians. The Italians are the mechanics of the city, and we shall find them also peddling onions, fish, and all kinds of goods from house to house. They are the newsboys and also the bootblacks. They own the grocery stores, and there are rich Italian bankers and traders. There are many large banks managed by the English, and some of the biggest stores are owned by the Germans. There are comparatively few people who have come from the

United States, although we have some large importing houses and several banks.

But let us go farther into the business section. Here we are in the Plaza de Mayo (plä′zä dā mä′yō). What a beautiful park, and how large are the houses about it! That great structure on one side of the square is the cathedral. There is a crowd of women in black gowns, with shawls over their heads, going to mass. The cathedral covers more than an acre of ground and will hold, it is said, nine thousand people. It is the chief church of the city, for Argentina is a Roman Catholic country, and Buenos Aires is said to be the largest Catholic city of the world. Catholicism is the religion of the state, and it is here that the president attends mass.

That building just above the cathedral contains the courts of the city, and on the opposite side is the rose-colored government house, where the president of Argentina has his offices and where most of the government business is done. Our president lives in the White House. The name of this president's palace is the Casa Rosada, which means the Red House. Argentina has a congress just as we have, and its people are supposed to choose their own officers much as we do. We visit the national capitol where congress meets. It is one of the fine buildings of the world and faces a beautiful park.

But let us go out to Barraccas. "Barraccas" means warehouses, and this is the name of that part of the city where most of the wool, wheat, and meat are prepared for shipment abroad. We stand on the corner and wait for the car. We hear a horn blown in the distance. The sound of it grows louder and louder, and we soon see that one end of the horn is in the mouth of the motorman, and that he gives a warning blast at every street corner.

As the car stops we climb in. We are carried through narrow streets for more than two miles, when we reach an enormous brick structure on the banks of the Riachuelo (rē-ä-chwā'lō) River, which flows into the Rio de la Plata here. The building is that of the Mercado Central dos

The Casa Rosada, or "Red House," where the president of Argentina lives.

Frutos, the largest wholesale produce market under one roof in the world. It covers thirty acres, and in it millions of pounds of wool are handled each year. It is so built that the cars can come into the market and the wool and wheat can be unloaded right upon the floors. Shiploads of wool sail up to its door, cars come in on the railways, and trucks, carts, and wagons loaded with wool and grain are driven in from all parts of the country. We go through one immense room after another. Some are filled with wool, and in others there are so many bags of wheat and corn that we have not time to count them.

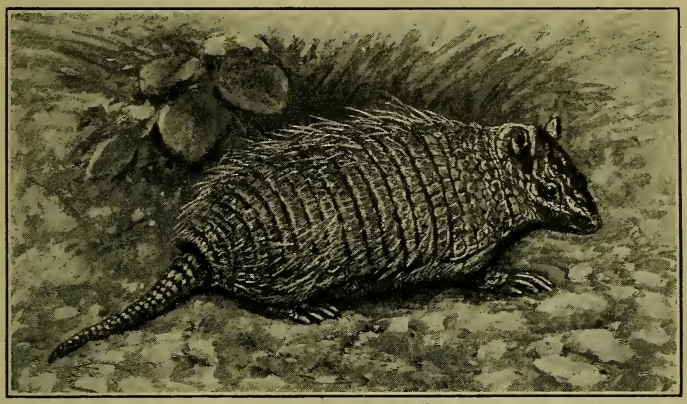
From the Mercado Central dos Frutos we visit the great frigerificos where thousands of cattle are killed daily and their carcasses chilled or frozen for shipment to Europe and the United States. We have to wear overcoats when we enter the freezing rooms. They are intensely cold, and the walls and ceiling are covered with frost, produced by liquid ammonia expanding in pipes throughout the room. The dressed beef is beautiful in its red and white colors, and when we tap it we find it as hard as stone. It will remain in this condition until it is ready for sale in the market houses of our country and Europe. This keeps the meat fresh, and when sold it looks and tastes like fresh beef.

On our way back to the hotel we call at one of the big city markets and see that the food which the Argentines eat is quite as good as our own. They have all sorts of meats, fish, and vegetables. There are huge pears from near Buenos Aires, and oranges and pineapples which have come on the steamer from Paraguay. There are grapes from the foothills of the Andes, and peaches by the bushel from the islands of the Paraná River. Peach trees grow so rapidly in this part of the world that they are often planted for fuel. In some places peaches are so plentiful that they are thrown to the pigs.

We meet many chicken peddlers on leaving the market. They are starting out with live chickens which they will sell from house to house throughout the city. The chickens are in wicker crates hung over the back of a horse. We see other peddlers on horseback or on foot. Now and then we pass a man driving a flock of turkeys before him. You can point out the one you want and he will catch it and sell it to you.

Have you ever eaten young armadillo? It tastes like spring chicken, and these people are so fond of it that they

eat thousands of armadillos each month. The armadillo is a little four-legged animal with a shell like a turtle and a head like a pig. It burrows into the earth and seldom goes out of its hole except at night. When attacked it rolls itself into a ball and is protected by the horny plates of its shell. It eats fruit and roots and small insects. Its flesh is white and quite tender; we taste it at one of the restaurants and find it delicious.



Armadillo.

But it is now five o'clock and we must go for a walk on the Calle Florida. This is the most fashionable shopping section, and its scenes at this time of the day are as gay as those of any part of the world. The street is only about thirty-five feet wide and about a mile long, but its fine shops make one think of a museum of rich goods and a treasure vault of costly jewels. The roadway is paved with cement, and the sidewalks are tiled like the floor of a bathroom. The street is so narrow that the police shut out all wheeled

traffic from five until eight in the afternoon, at which time most of the shopping is done. During these hours there are no carriages or automobiles to be seen, and a boy on a motorcycle would surely be arrested. The people we meet are well dressed, and we hear French, German, English, Italian, and Spanish spoken by different parties as we pass along.

We see many fine turnouts on Thursday afternoon, when we take a drive by the magnificent residences along the Avenue Alvear to Palermo Park. This park is perhaps the finest in all South America. It covers many acres, and in it are long avenues of magnificent palms, forest trees of all kinds, running streams and winding lakes. During the afternoons of Sunday and Thursday it is filled with people. There are hundreds of automobiles moving along and thousands of foot passengers walking under the palms. There are gayly dressed children playing upon the grass, and boys rowing about in boats on the lakes.

We see the children enjoying themselves in other ways during a short trip we make from Buenos Aires to Mar del Plata, the favorite seaside resort. Here they dig in the sand and go swimming in the ocean just as we do at home.

1. What important grains are raised in Argentina? Compare its wheat farms with those of the United States.

2. What three countries produce more wheat than Argentina? (See Table X.) What countries produce most per acre? What great pest occasionally afflicts the Argentine farmers? Of what plague in Egypt described in the Bible does it remind you?

3. Name the chief grain ports.

4. Locate Tucuman. Describe some of its products.

5. Describe Cordoba and Rosario. For what is Mendoza noted?

6. Where are the best flax fields? For what is the product used? What other very important things do we get from the flax plant? (See Carpenter's "How the World is Clothed," pages 50–55.)

7. Make a tour of Buenos Aires and describe it. Compare it with Chicago. How far is it from New York via Valparaiso? Direct?

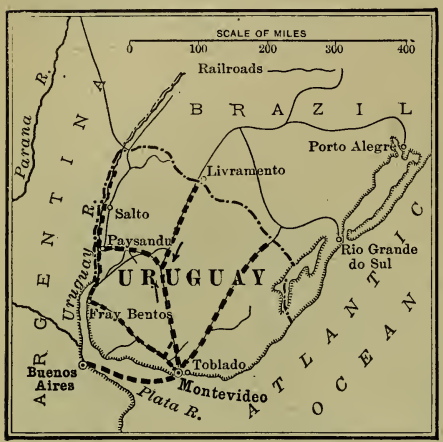
8. Visit a large meat-packing establishment and tell what you see. Where are our chief meat-packing centers? Trace a cargo of beef from Buenos Aires to Liverpool; to New York. How far does each shipment travel?

9. What do we find in the wool market? How does Argentina rank among the sheep-raising countries? Name its chief competitors. Name a strange meat of Argentina.

We leave Buenos Aires on a river steamer for Montevideo. These boats are much like those which ply between New York and Boston. One leaves each city every night.

XXX. URUGUAY — MONTEVIDEO

WE shall begin our journeys in a new country this morning. We leave Buenos Aires on a river steamer for Montevideo and seven hours later are casting anchor in a fine harbor on the Rio de la Plata only ninety miles away. The day is just dawning, and the lights on the shore shine out through the mist, marking the shape of the city and harbor.



The Bay of Montevideo is like a horseshoe; it is six miles in length and so large that hundreds of vessels could be anchored in it at one time. Of late years, however, the earth washings brought down from the highlands, through the Rio de la Plata, have so filled the bay that extensive harbor improvements have been made to allow large vessels to come near the shore.

But let us take a bird's-eye view of Uruguay before we begin to explore it. It is the smallest of the South American republics, and there are single states in Argentina which surpass it in size. Uruguay could easily be lost in Brazil, for it is only about as large as Missouri.

We can see something of its shape on the map, but if we could fly over it in an airplane, or perhaps on the winged

horse Pegasus, we should see that with the exception of a few low mountain ranges it is a waving sheet of billowy green, with so many streams of silvery water flowing through it that they form a network like the veins of a leaf. We should see that it has rich soil and that cattle and sheep are scattered over it in quite as large flocks as those of Argen-

Children playing in the sand at Mar del Plata, the favorite seaside resort.

tina. The country is level or rolling and has hardly any waste land.

If we flew slowly we might observe that the houses of the farmers are like the mud huts of the Argentine pampas and that the aspects of nature are about the same.

The climate of Uruguay is delightful. The country is as near the equator as Florida, but the weather is not so hot in summer nor so cold in winter.

The Plaza de la Independencia of Montevideo. The square covers ten acres. Upon it face the Government buildings.

In such a flight we should notice the long coast line of the country, the great steamboats sailing up the Uruguay River, and the smaller boats on other streams in the interior. We should see but few large towns, and should notice that all the railroad trains, steamboats, and carts are moving to and from the capital city of Montevideo, which we are about to explore.

We take a boat and ride to the wharves, observing the Cerro or hill at the left from which the city was named. Montevideo means "I see the mountain." The mountain in this case is not higher than the Washington monument, but the land is so flat all about that the hill can be seen far out at sea. There is a white tower upon it, and at night the revolving light in it is visible twenty-five miles from land.

But here we are at the wharves. We step out and take a look at the harbor, which has been improved at a cost of tens of millions of dollars. There are many ships from Europe and the United States at anchor within it, and we learn that it is a port of call for all the steamship lines that come to this part of South America. There are also steamers that transport goods on the Rio de la Plata system and boats that leave every night for Buenos Aires.

We ask as to the trade and are told that the chief exports are wool, hides, meat, beef extracts, and live stock, and that the imports are cotton and woolen goods, iron and steel, coal and machinery.

Leaving the port we wend our way through the city. The buildings are large, the streets wide, and there are many parks filled with tropical plants and beautiful flowers. There are automobiles, motorcycles, and many electric car lines.

How clean the streets are! They are kept so by the long tongue of rock upon which Montevideo is built. The

rock extends from the Cerro or hill out into the bay. It slopes on all sides so that the streets run up hill and down and every rain washes them clean. Montevideo is a very healthful city; fewer people die in it, in proportion to its size, than in any other city of the world.

We step aside to get out of the way of the motor-trucks and carts. The carts are each drawn by two or three mules harnessed abreast. Each has a bed made of poles with sides of poles curved upward and tied together with thongs. The wheels are enormous and make a great din as they rattle over the cobblestone streets. There are other carts coming up this side street. Is it not strange that they do not use wagons? No, not when you learn that all vehicles in Montevideo are taxed by the number of wheels, and that a four-wheeled wagon would have to pay twice as much as a cart.

Montevideo has a good street-car system and we can go anywhere upon it. We ride in the cars by two-story and three-story houses, now passing great plazas or squares filled with trees. We go out into the country through the wide boulevard of General Artigas, which is lined with beautiful gardens from one end to the other, and visit Urbano Park and the Rambla de los Pocetas (pō-sā′täs). The latter is the chief seaside resort of Uruguay, and people come here from Argentina and Paraguay to enjoy the fine bathing. There are large hotels right on the sea, and near them are many boxes on wheels in which the people put on their bathing clothes. The bathhouses are then drawn by mules to the edge of the water. We each select one of these bathhouses and are soon far out in the surf enjoying the salty billows as they roll up on the shore.

Coming back to our hotel, we take automobiles and explore the city. It is about as large as New Orleans and it

has all modern city improvements. The streets are wide, straight, and well paved, the principal street running along the top of a ridge and ending in the Plaza de la Independencia. We visit the Solis Theater, one of the largest in South America, and the fine new national capitol where congress meets. We are shown through the cathedral and

The bathhouses are drawn to and from the beach by mules. The author stands at the right.

then go to the public library and some of the educational institutions.

Montevideo has a great university. It has asylums and hospitals, medical schools and laboratories, and it is one of the most advanced of all cities as to health matters. There are common schools almost everywhere and education is compulsory. The city has free lunches for school children, and the school girls are taught how to cook and sew while

School girls of Uruguay are taught to sew.

the boys learn manual training. In some of the country schools the children study out loud, and in our motor rides we may hear the din of a school before we come to it.

Montevideo has many rich people who have large estates in the country. They live upon their farms in summer and spend their winters at the capital city. During our stay we visit some of these well-to-do families. Their houses are grand, the floors are of marble, and the ceilings are often upheld by marble columns imported from Italy. We find the rooms cold. The people believe artificial heat is unhealthful and so they have no stoves, furnaces, or steam-heating plants. The result is that in the winter the women often receive callers in their furs with their feet on hot-water bottles, and the men sometimes wear their overcoats at dinner.

From Montevideo we take some trips out through the country. We cross to the boundary of Brazil by railway, and on the way back visit other places by motor-car. We travel some time on the Uruguay River, visiting the ports of Salto (säl'tō) and Paysandu (pī-sän-dōō'), and stopping at Fray Bentos (frī bĕn'tōs), where hundreds of thousands of cattle are yearly killed for meat extract. The lean meat is stewed in warm water, being skimmed again and again of the fat. After a long time the stew thickens into a liquid much like thin molasses. It is then put into tin boxes and sent to Europe, where it is repacked in porcelain jars and shipped all over the world. Many of us have tasted beef tea made from this Uruguay extract. It is found in our drug stores and is often prescribed for sick people.

Not far from Fray Bentos are the factories in which jerked beef is made. Such meat is much liked by the South

American people. It is taken by the shipload from Uruguay to Brazil and the West Indies. The animals are killed and the meat stripped from their bodies and dried in the sun in such a way that it will not spoil, however long it is kept.

Coming back to Montevideo, we visit the huge packing establishments where cattle and sheep are killed and dressed for shipment to Europe. The scenes are much like those we saw in similar places in Argentina. The cattle are brought in on the cars or are driven on foot to Toblado, an open-air market held in the fields several miles from Montevideo. Here they are driven about by the gauchos or cowboys, while the buyers select such herds as they want and shout how much they will pay. Thousands of animals are sold in one day, and at the time of our visit ten thousand long-horned cattle are bought by the packers. When the sale is over the animals are weighed and driven to the *frigerificos*, where they are speedily killed. Some of the beef is chilled and shipped to New York, but most of the product goes to Europe, and a great deal to England.

1. Bound Uruguay. What did you see in traveling by airplane over the country?

2. What does "Montevideo" mean?

3. Describe the city. Tell why it has become great. How far is it from New York? At 15 miles per hour how long is the voyage?

4. Mention the chief products of Uruguay. What is beef extract?

5. What are the chief exports of Uruguay? The chief imports?

6. If a ship went from Galveston to Montevideo and came back to Boston, what would be the probable cargoes of each voyage?

7. Compare Uruguay in size with other South American countries; with your own state.

8. Trace a cargo of chilled beef from Montevideo to London; to New York; to Liverpool; by two routes to San Francisco, giving the length of each route.

XXXI. UP THE RIO DE LA PLATA SYSTEM

WE are again upon shipboard this morning. We have left Montevideo and are steaming through the Rio de la Plata, upon whose two great tributaries, the Paraná and the Paraguay, we shall go into the heart of the South American continent.

What a big stream it is! At Montevideo we could hardly see the opposite shore. It is wide all the way to Buenos Aires and even to the junction of the Uruguay and Paraná rivers, by which it is formed. The Rio de la Plata, in fact, is more like a muddy fresh-water bay or arm of the sea than a river. It is about two hundred miles long, and where it unites with the ocean it is more than one hundred miles wide.

The water of the river looks like pea soup. We hesitate to get into our bath, and when we let off the water a thick coat of mud remains in the tub, so much that our feet leave marks as deep as those which frightened Robinson Crusoe on the shore of his desert island. The Rio de la Plata system brings down a vast amount of earth washings from the mountains. It contains so much silt that if it could be put upon wagons, twenty thousand horses all pulling at once could not haul away the load of one hour. So much mud drops to the bottom that the river is fast filling up. It is already difficult for the big ocean steamers to reach Buenos Aires, and the people are now talking of a system of jetties like that of the Mississippi to deepen the channel.

The Rio de la Plata system drains a basin about half as large as the whole United States. If we could view the basin from above we should see that it is of the shape of a horseshoe, with the opening toward the Atlantic. The highlands of Brazil and the Andes form the rim on the west,

north, and east, while a low divide completes it on the south. Within this shoe lie the best lands of Argentina, the whole of Uruguay and Paraguay, and large portions of Brazil and Bolivia.

In climate this basin is similar to that of the Mississippi basin reversed. The northern and upper part of the Mississippi basin is cold; the northern and upper part of the Rio de la Plata basin is warm. Can you tell why?

The greatest tributaries of the Rio de la Plata come from the hot lands of Brazil and Bolivia where palms and rubber trees grow, and its mouth lies in the cooler countries of wheat fields and pastures where we have been traveling lately. Almost everywhere the climate is healthful. The northern parts have weather much like that of Louisiana or Florida, and the south has about the same climate as that of our Middle States. Our ship stops at Buenos Aires for passengers and freight, and we then start on our way to the great Paraná, the main downspout of the system.

We soon pass the mouth of the Uruguay River, and just before entering the Paraná sail about the islands of Martin Gracia (grä-sē′ä). We can see with our glasses the fort upon its shore. There are boys in soldier uniforms marching about. They belong to the Argentine Naval School which has been established there; the men drilling are soldiers used to defend the fortifications.

Martin Gracia is called the "Gibraltar of Argentina," for it guards the chief entrance to the Paraná River. It is famous in history. It was here that the Spanish explorers who first visited Uruguay stopped for a time. During their stay their pilot, Martin Gracia, died and they gave the island his name as a monument. As we sail by it we remember that we, too, are on an exploring expedition. We are entering waters which were discovered by the white man who,

with his father John, was the first to set foot upon the soil of the North American continent. This was Sebastian Cabot, who, only thirty-four years after Columbus landed in America, came here and entered the Paraná River. He traveled up that part of the Paraná through which we shall go, and from it went into the Paraguay River over the very same way we shall sail.

I venture, however, that Sebastian Cabot, if he could be with us to-day, would think our boat, although only a river steamer, more wonderful than anything he saw on his tour. His ship was not one tenth as large. It was a small sailing vessel and took months to go up the river. He would not understand how we could move without sails. Steam as a motive power was not then discovered, and he would not know how we could make the great paddle wheels move us onward so fast that the voyage can be made in six days.

Cabot's ship was probably lighted with tallow. How he would wonder at our electric globes and the other curious things which have been invented since then.

He would be surprised when he sat down to meals and might think the food rather good for explorers. Here, for instance, is our bill of fare for one dinner: ox-tail soup, Bologna sausage with potato salad, boiled beef, fish caught in the Paraná River, curried chicken and rice, beefsteak and potatoes, cheese, guava jelly, English walnuts, almonds and raisins, oranges, and coffee.

Passing Martin Gracia, we sail for several hundred miles through the delta of the Paraná. For a day's ride north of its mouth the river is about twenty miles wide. It has many channels and is dotted with islands. Some are covered with forests of peach trees, and others are cultivated by the Italians, who raise vegetables for Buenos Aires.

All the islands are low and many have curious houses upon them. We are passing them now. They look like sheds. They are raised upon piles, the first floor being reached by long ladders. This is in order that the people may keep out of the way of the floods, for the winds and the tides sometimes roll great waves in from the ocean.

After traveling up the stream for a day we reach Rosario, and steam on by ocean ships such as we saw from the bluff after our tour of the wheat fields. They are still loading wheat, and thousands of yellow bags are bobbing up and down as they glide over the chutes. There are flour mills and grain elevators at Santa Fe and other towns farther up, and much of the shipping of the Paraná River is devoted to carrying grain.

As we go on we are more and more delighted. The Paraná is picturesque although the lowest parts of it have no grand scenery. It is wider than the Mississippi and seems at times like a great inland sea, the shores being so far apart that we cannot always see both banks at once.

This is largely due to the islands, of which the Paraná has so many that they have never been counted. In our journey we are always sailing in and out among them, now coming close to the high bluffs of the mainland and now passing through narrow channels, so near the shore that we can almost catch hold of the willows and feathery grasses, which hang over and mirror themselves in the water.

But look, some of the grassy islands are moving! That great mass of green over there is going past our steamer on its way down the river. It is moving almost as fast as our engine is pushing us up the stream. See, the waves from the ship are making the island move up and down. It is a sheet of billowy green rising and falling with every wave. That is a floating island! There are many such in the

Paraná River. They are masses of weeds, flowers, and turf which the floods have torn from their foundations in the highlands and are carrying down to the sea. Some are so firm that they will support a man; and during the floods peccaries, jaguars, and snakes are often carried upon the islands out to the ocean.

Now we have left the middle of the stream and are passing close to the great bluffs of the mainland. We are trying to avoid that sand bar which is being built up by the river. In places the banks are torn down, and all about us are examples of the great part the waters have in shaping the earth.

The rivers are the masons of the gods, and as we look about us we realize what a master workman this mighty Paraná is, and how it has aided in building up the Rio de la Plata basin. The river sweeping past us faster than a man can walk is loaded with mud. It has been bringing down mud for ages, and most of these islands have been built up by the sediment it has dropped.

The streams of the Andes are now gathering dirt for this river, and its waters are carrying it down to the lowlands. That island of a hundred acres of green which is now floating by is made of earth washings brought down from the highlands. Some of its particles were torn from the roots of the rubber trees in Brazil, some have come from coffee plantations a thousand miles farther north, and some were loosened, perhaps, by the Indians we saw mining gold in the wilds of the Bolivian Andes. That bluff at our right is one hundred feet high. See how its strata or layers of earth are piled up one on top of another like those of a jelly cake. Those layers have been deposited there during the ages by running water and as we steam on we can see the farms of the future rising slowly under our eyes.

Palm Grove near Corrientes.

Notice that sand bar. Next month it will be an island. Next year it will be covered with grass, and trees will sprout up.

The land and sky seem to change every hour. The sunsets are gorgeous, painting the clouds with all the hues of the rainbow and making a golden canopy over the dark-blue Paraná. We get up before day to see the sun rise. As it comes up its rays strike the dewdrops upon the feathery grasses of the islands and myriads of diamonds flash from the emerald fields. At night both heavens and earth are clad in the glorious moonlight of the semi-tropics.

As we travel on toward the equator we see many more trees. The islands are covered with them, the grasses are more luxuriant, and here and there are bunches of bamboo.

Now and then there is a palm tree shading a house on the mainland, and oranges and lemons are brought to the steamer at some of the ports. We stop at many small towns of one-story buildings with thatched huts about them. The houses are roofed with red tiles and there is always a church spire rising high over the town.

After three days we reach the city of Corrientes (kŏr-rē-ĕn′tĕs). It is quite a large place for this part of the world and is a port from where are exported sugar, tobacco, and cotton as well as sheep, cattle, and horses. Corrientes looks very imposing in its position on the high east bank of the Paraná. It is close to the junction of the Alto-Paraná and the Paraguay rivers, and at its landing we see steamers starting up the Alto-Paraná, upon which they can sail farther on to the northeast for hundreds of miles. Our own ship, however, is on its way to Asuncion (ä-sōōn-syōn′) in Paraguay, and as that is the country we are next to explore we shall leave the Paraná and steam up the Paraguay.

XXXII. THE GRAN CHACO

DURING our ride on the steamer we have heard much of the Gran Chaco (grän chä′kō). This is the name given to a large territory west of the Paraná and Paraguay rivers, some of which belongs to Argentina, some to Paraguay, and some to Bolivia. It extends for more than five hundred miles along the western banks of the rivers, running back almost to the foothills of the Andes. It is four or five times as large as New England, but its boundaries are not well defined and the greater part is still unexplored.

Most of the Gran Chaco is a vast plain less than a thousand feet above the sea. It has many great swamps and is crossed by the Pilcomayo and Bermejo (bĕr-mā′hō) rivers, which rise in Bolivia and flow into the Paraguay. Both streams are crooked, shallow, and obstructed by sand bars, but there are small boats on the Pilcomayo, and little steamers which will take us several hundred miles up the Bermejo. The country is well watered; it has great forests and millions of acres of highlands covered with grass. In the Argentine Chaco at the south they are making farms to raise cotton, sugar cane, and corn. Already many large estates have been formed. Farther north are extensive pasture lands, and the country will some day support a great many people.

The Paraná basin contains some of the best wood lands of South America, and Argentina alone has forests which cover an area almost as large as Texas. Most of these are in the Chaco, and there are other large forests in that part of the territory belonging to Paraguay and Bolivia.

In these regions the trees are of many varieties. There are soft woods that will float, and hard woods so heavy they will sink like a stone. Among the soft woods is a red cedar used for cigar boxes, and woods excellent for pulp and paper. One of the most important of the hard woods is the algaroba (ăl-gä-rō′bä), which looks like black walnut. It is used for paving blocks, and many streets in Buenos Aires are paved with it. Another hard wood is the lapacho, which has a beautiful grain and takes a fine polish. It is as strong as hickory and can be used as spokes for the wheels of wagons and automobiles.

The most important wood, however, is the quebracho (kā-bräch′ō), which not only is good for railroad ties and telegraph poles, but also contains so much tannin that

it is extracted for shipment to all parts of the world to be used in the manufacture of leather. A great part of the leather used in the United States is tanned with quebracho. In making the extract the wood is ground to sawdust and boiled. The extract is exported in cakes, which are afterwards reduced to a liquid. The word "quebracho" means ax-breaker. The tree is so hard that it will turn the edge of an ax, and when used for railroad ties, holes have to be bored for the spikes, for they cannot be driven into the wood.

As we think of the forests it seems strange that they do not supply lumber to all parts of the Paraná basin. It would surely be cheaper to get out this wood for Argentina and Uruguay than from our forests in Oregon and New England. Yes, it seems so at first, but not after we have studied the matter. Much of the Chaco wood is so heavy that it will not float. The logs must be loaded upon carts and dragged through the forests or else taken by railroad to the Paraguay River before they can be shipped down to Buenos Aires. In our country we have the snow to help us get the logs to the rivers, and our lumber floats. Here there is no snow. It costs a great deal to get the logs out of the forests, and the freight rates on the steamers are so high, that it is much cheaper for the people near the coast of South America to bring their lumber from North America, five thousand miles farther away, than to buy it here nearer home.

The Gran Chaco is for the most part as wild as it was when Sebastian Cabot sailed up the Paraná. Its chief inhabitants are Indians, some of whom go naked all the year round. The Tobas, for instance, wear almost nothing except when they cross the Paraguay River to trade. They are among the tallest of the red men, some being over six feet in height. Their skin is so thick they can walk on

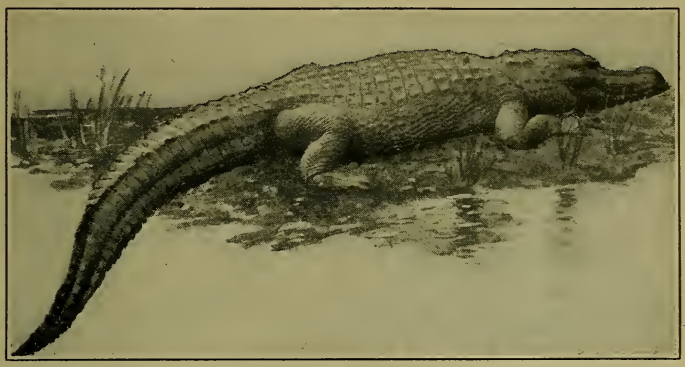
thorny ground without sandals. They tattoo themselves with blue and red lines and dye their hair yellow. The Toba braves are good hunters and fishers, but the squaws do most of the work, planting the crops, cooking the meals, and weaving the blankets.

Many of the Indians are nomads, wandering from place to place. They need few clothes and no permanent houses.

Another tribe of the Chaco are the Lenguas, who are experts in taming wild animals and birds. Farther north are Indians who were noted as oarsmen when the Spanish first came. They were terrible warriors and had their oars tipped with spearheads so that they could use them as weapons.

Many of the South American Indians are nomads, wandering about from place to place. Others have villages of huts

so built together that one roof of straw thatch covers several houses. The people sleep on skins on the bare ground. The women are quite cleanly, washing their pots and pans at the close of each meal. They are good cooks, although they have but few cooking utensils. Forks are unknown, every one carries his own knife, and shells are used for spoons. The chief weapons of the Indians are bows and arrows, and with them they can bring down the most savage beasts of the forest.



Alligator.

The Chaco is a great hunting country. There are alligators in all the streams, and in traveling near the water at night we have to move carefully lest we step on them.

As we camp overnight in the forest we are now and then aroused by the crack of a branch, and see the fierce eyes of a brute flashing out of the darkness. It is a jaguar after our dogs. These animals hate dogs and it is dangerous to travel with them through the forest. It seldom attacks men, and if we meet one in the underbrush a yell will usually drive it away.

Another curious animal of the Chaco is the aguara guazu, a species of wolf dog about a yard long. It has sharp ears, a pointed muzzle, and yellow fur with a bushy tail like that of a fox. It has a hoarse bark which can be heard a long way. This dog lives in the swamps and goes out hunting at night. It attacks sheep and deer, and will fight for its life with a jaguar.

The jaguar is the largest of the cat family in America, and almost equals the tiger in strength and ferocity.

But what is that shrill, whistling cry which we hear night after night in the forest? That is a tapir, an animal about the size of a yearling calf with a head like a pig, and a snout like an elephant's trunk but much shorter. It is inoffensive if let alone, but it will bite and kick our dogs if they go near it. The skin of the tapir is so thick that it is almost impossible to kill it unless it is shot in the forehead or behind the shoulder.

Even more dangerous are the peccaries, which are found in great numbers in parts of the Chaco. They are little wild pigs with sharp teeth, and go about in herds of eight or ten and sometimes fifty or more. They are ferocious and often attack travelers who come near them on foot. If we should meet them it will be best for us to climb trees and shoot at them from there. Peccaries live on roots and

Tapir.

fallen fruits. They eat the wild oranges and nuts of the woods. At night they sometimes sneak into the Paraguayan villages for the oranges that grow in the gardens.

The Chaco has parrots, toucans, and other gorgeous birds of the tropics. It has one bird whose feathers are said to shine like flames of fire and another which has dancing performances, when a dozen or more will rush into an open place

and dance about, screaming and raising their long beaks as they do so.

The streams of the Chaco are full of odd fish, some of which live in the mud, and one of which will attack and bite men. The latter grows to a length of a foot and a half. It has teeth as sharp as a razor, and its jaws are so strong that it can drive them through one's flesh to the bone.

1. Describe the Rio de la Plata basin. Compare it with the Mississippi valley.

2. Name the discoverer of the river. Compare his boat with one of the great steamers of to-day. What do you know about him? Where is Gibraltar? What strait does it guard? Tell the story of the first steamboat; the first electric lights.

3. What is the length of the Paraná River? How does it compare with the Amazon? The Orinoco? The Mississippi-Missouri?

4. Show how rivers build up the lowlands. How are the floating islands formed?

5. Describe the Gran Chaco. To what three countries does it belong?

6. What important products come from its forests? Trace a shipment of quebracho from Corrientes to the tanneries of Newark, New Jersey.

7. Why does Argentina, which has vast forests, import lumber from Oregon and New England?

8. Make a hunting trip through the Chaco and describe the Indians you might see. Compare these Indians with those of Peru, Bolivia, and Chile.

9. What is a tapir? A peccary? A jaguar?

XXXIII. PARAGUAY

WE are on the Paraguay River this morning. We have left Corrientes and are steaming northward through a country of forests. The water is not so muddy as that of the Paraná, on which we have been traveling, and the stream is not nearly so wide. It is, however, a mighty river as deep as the Mississippi and about eighteen hundred miles long. It is navigable for steamers for more than a thousand miles above Corrientes, and small vessels can go upon it far into Brazil.

We get our first sight of the republic of Paraguay soon after leaving Corrientes. That land along the east bank is a part of it, and those villages with the orange trees about them are the homes of Paraguay people.

As we sail onward the country grows considerably wilder. Our vessel moves this way and that in following the channel, and we are often close to the great trees on the shore. The forests of this region abound in timber which is excellent and of great durability. We hear parrots screaming at us from the branches, and now and then with the glass catch sight of a monkey grinning out through the leaves. There are many birds of beauti-

ful plumage, and flocks of wild ducks rise from the lagoons which we pass every few miles. We get our guns and take a shot at the birds. We shoot also at the alligators on the shore and at those which scud through the water or dive down as we pass.

The west bank of the Paraguay River is especially wild. It belongs to the Gran Chaco, and we could not travel a mile inland without meeting jaguars and monkeys, and we might even see boa constrictors as large as those of the Amazon basin. We stop occasionally at one of the towns on the east bank and finally come to anchor at the wharves of Asuncion, the capital of Paraguay.

Paraguay, like Bolivia, is a country without a seacoast. It lies about as far inland from the Atlantic Ocean as our state of Michigan, but by the winding way up the rivers we have journeyed as far as from New York to Omaha. We are now about midway on the west border of Paraguay proper. The country is composed of two divisions, Paraguay proper and the Chaco. We have already learned something of the Chaco. It is the "Wild West" of Paraguay. It is but little developed and inhabited chiefly by savage Indians and wild beasts. It is the vast territory lying west of the Paraguay River and north of the Pilcomayo River, being bounded on the north by Bolivia. The Chaco has large forests, many swamps, and some cultivable lands. Almost all of it is still in a state of nature, having been but little explored.

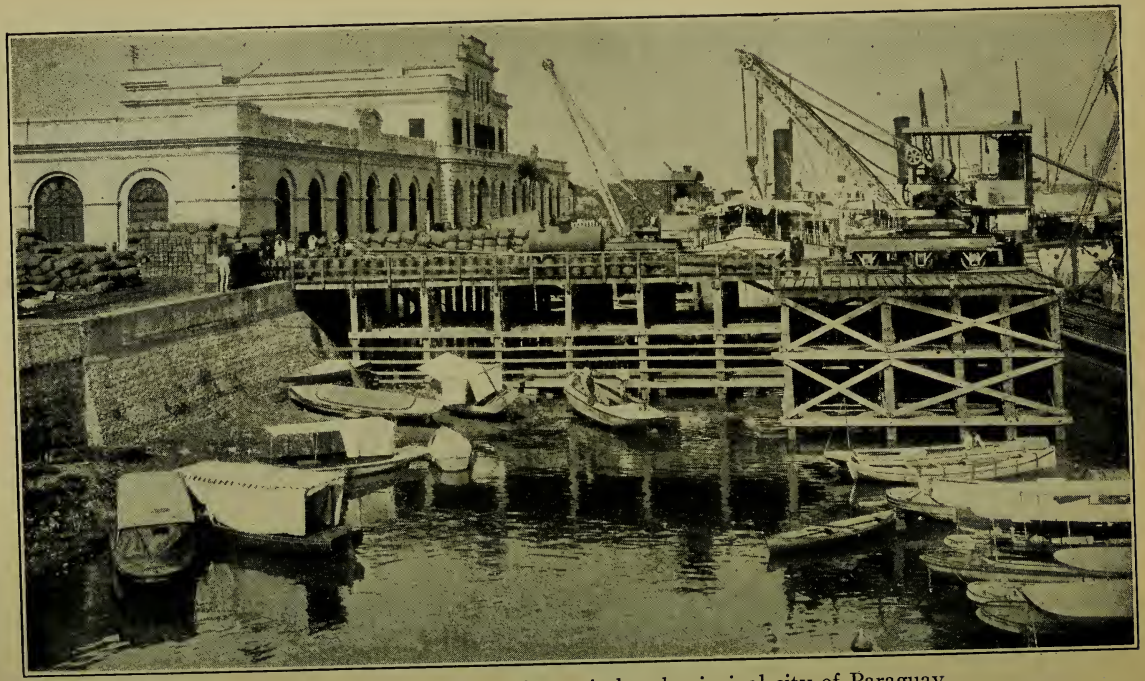
Paraguay proper is the settled part of the republic. It has all the cities and towns and is the only part in which many civilized people live. It lies east of the Paraguay River and north of the Paraná, being located somewhat as Illinois is in our own country, the Paraná corresponding to the Ohio River, and the Paraguay to the Mississippi.

The country is larger than Illinois and much like it in character. The land is beautifully rolling with numerous streams upon which the crops can be moved to the ports of the Paraná and Paraguay rivers. It has great pastures and large tracts of rich soil. Running through it are one or two low mountain ranges which are covered with forests and add greatly to the beauty of the scenery. The climate is much like that of Florida, and therefore the products are semi-tropical. There are small plantations of tobacco, manioc, and sugar cane. Orange trees grow everywhere, and clumps of palm trees upon the great plains.

The people of Paraguay are few. They are composed of the whites, of the mixed race, and of pure Indians. Those of the white and mixed races number only about six hundred thousand, while there are, perhaps, one fourth as many Indians. When the Spaniards first came these Indians were more civilized than most of the other tribes of the continent, and many of the Spaniards took Indian wives. Their sons and daughters also married Indians, and we find nearly all the people now have more or less Indian blood in their veins.

The Indians were of the Guarani (gwä-rä′nē) tribes and to-day the Guarani language is more used than the Spanish. We shall take with us a guide who understands Guarani to act as interpreter during our tour, for we may be in places where the people cannot speak Spanish.

Paraguay has no large cities. The largest by far is the capital, Asuncion, which is as big as Grand Rapids, Michigan. The next is Villa Rica (vēl′yä rē′cä), the population of which numbers thirty thousand or more, and after that Villa Concepcion and Villa Encarnacion (ĕn-kär-nä-syōn′), fast-growing ports on the Paraná and Paraguay rivers. Small towns and villages are scattered about the country.



At the wharves of Asuncion, the capital and principal city of Paraguay.

The city of Asuncion is the business, social, and financial center and has always been the principal town of Paraguay. As we go through it we shall find many modern improvements. It has banks, telegraphs, colleges, and newspapers, the latter sold by newsboys as bright as those of our cities. There are good houses, several large churches, and many buildings mossy with age.

Asuncion is one of the oldest cities of our hemisphere. It was founded in 1536. The first babies born in it had grown into gray-haired men and women before Captain John Smith landed at Jamestown. It was long one of the chief centers of civilization of South America, and for some years was more important than either Buenos Aires or Montevideo. It lost this place after the great war originated by President Lopez between Paraguay and the combined forces of Argentina, Uruguay, and Brazil, in which Paraguay was forced to give up much of her territory. At that time Asuncion was almost destroyed and the country laid desolate.

Indeed, so many of the men were killed that the women had to do all kinds of work. This is so to-day. We notice this as we walk from the wharves into the city. It is early morning and the streets are filled with women going to and from market. How like ghosts they look! Each is clad in white with a long cotton sheet wrapped about her head so that only her dark face shows. The most of them are barefooted, and they make no noise as they walk spirit-like through the streets. There is one coming toward us who has a great jar upon her head and a load of firewood in her arms. She is walking rapidly, and her dark legs below her white skirts show halfway to the knees. Behind her comes another white-sheeted figure upon whose head is a basket of oranges with a chunk of raw meat on top. The

Business street in Asuncion. The sign on the right means "English Shop."

basket is perfectly balanced and she walks along without touching her burden. There are other women carrying all sorts of things on their heads — bags of vegetables, pans of meat, bundles of firewood; in fact, they carry everything on their heads. It seems no trouble to keep the loads steady, for as we pass they do not lift their hands and take no pains to avoid being jostled.

Paraguayan water carriers. The square objects are Standard Oil tins, in which petroleum has been brought from the United States.

Asuncion is laid out in the Spanish style, the streets crossing one another at right angles with a park or a plaza here and there. Many of the streets are paved. There are electric car lines in all parts of the city and suburban lines reach out into the country. The city is now connected with Buenos Aires by railway and has a fine railway station.

The streets are wide, but the town is so up hill and down

that there are but few carriages and automobiles. There are many donkeys ridden or led by boys. Many of the carts are hauled by three mules abreast; the animals go so fast that we jump up on the sidewalk to get out of the way.

What curious houses! They are almost all of one story, built in blocks close to the pavement so that they form solid walls from street to street. All have iron-barred windows and each is a different color. Here is one of sky blue, the house next to it is rose pink, and over the way is one of pale yellow.

Here comes a policeman. He is dressed in a blue uniform with a long sword at his side. If he should arrest us he would take us into a red jail and on the way we should pass the lilac-colored building in which congress meets. We might see the cream-tinted palace from where the president rules, and should go by houses of every color. The schoolhouse may be of any color of the rainbow. The children usually go barefoot to school, it is so warm.

Let us take a look at the business part of the town. The stores are not large but they are stocked with goods from all parts of the world. That building on the corner is the chief hotel of the country. It was once a palace of the tyrant Lopez.

The market house is a block farther on. It looks more like a monastery than a market. It is a great one-story building running about a hollow square, with a low roof of galvanized iron which extends out upon all sides, over the cloisters or wide porches which surround it. The market house is painted red, the color forming a bright background for the strange figures about it. People are buying and selling at the meat stalls in the building. The court inside is filled with tables and benches where all kinds of Paraguayan things are sold.

Let us stop in the porches and look about us. Every part of the market is swarming with women. There are scores of them sitting on the bricks with their wares spread out before them. Others stand behind the butcher counters and with knives and saws cut up meat for their customers. Others have vegetables, laces, and jewelry, which they beseech us to buy. What a chatter they make as they bargain! There are no scales or measures. See this vegetable woman who is sitting almost under our feet. She has a stock of green peas which she has arranged in piles on the bricks. There is about a pint in each pile, and the customers buy by eye measure. Each purchaser brings a cloth to wrap what she buys, for the women furnish neither paper nor string.

In going through the market we can learn much concerning the chief products of Paraguay. We see tobacco sold everywhere and learn that Paraguay raises considerable tobacco for export to Europe, although most of the crop is consumed at home. Three fourths of the women we meet have cigars in their mouths. Both buyers and sellers are smoking like chimneys. Some of the women are chewing cigars, and others are rolling up leaf tobacco to smoke. We see small girls smoking and chewing, and boys of six or eight years smoke without stint.

Among the other things sold in large quantities are manioc and oranges. Manioc is a root which takes the place of both potatoes and wheat as food. It grows in great bunches, each root being about the size of a carrot. There are two varieties, one of which is boiled or roasted like a potato, the other must first be ground and squeezed to take out a poisonous juice which it contains. When dry it becomes a flour that is eaten in soup and stews and in other ways.

XXXIV. A TRIP INTO THE INTERIOR OF PARAGUAY

TO-DAY we are traveling through the interior of Paraguay. We have taken our seats in one of the first-class cars of the railroad which runs from Asuncion to Villa Rica and thence southward to the Paraná River at Encarnacion, where it connects with the railway system of Argentina and goes on to Buenos Aires.

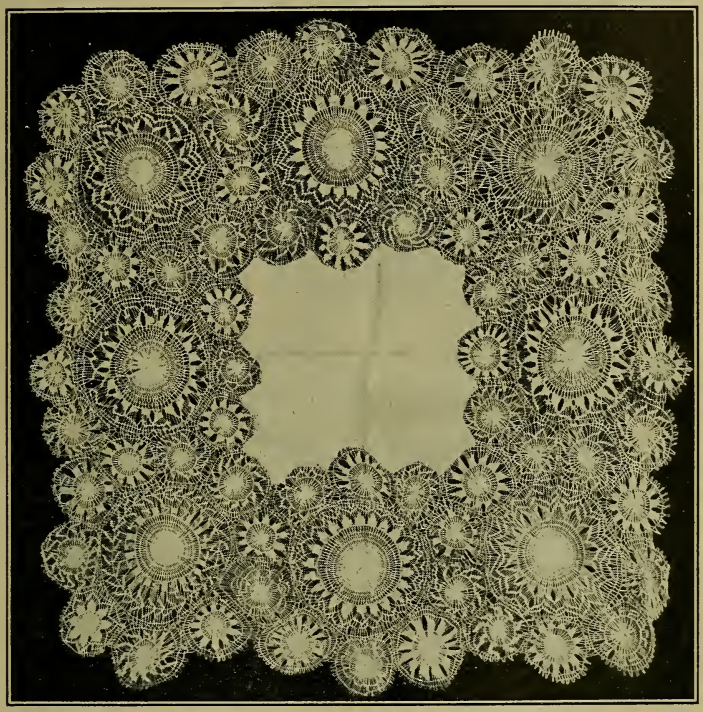
Leaving Asuncion, we pass the villas of rich Paraguayans, go by the agricultural college where the boys are playing under the palm trees, and then on into great pastures bordered with bushy woods and spotted here and there with small clumps of trees. The country is naturally fitted for live stock, and some day it will be one of the chief meat-producing lands of the world. It already has millions of cattle and sheep and tens of thousands of horses and goats.

The lands are as rich as our prairies and resemble them, save that thickets and groves everywhere give shade for the cattle. We are in a vast sea of grass which seems to be flowing in and out among islands of trees. In summer the woods are fragrant and the plains are covered with beautiful flowers. Paraguay has miles of such pastures and the red soil grows the richest of fodder.

There is a big herd of cattle now at our left. We can see the gauchos on horseback moving to and fro among the beasts and driving them this way and that. They are probably picking out the best for shipment, or they may be about to brand the stock.

A little farther to the right we see a village and we pass small towns every few miles. Most of the Paraguayans live in villages. Their houses are merely thatched huts with walls of woven poles covered with mud.

We can visit one while the train waits to change engines at one of the stations. What a rude hut it is! It has two parts, a room about fifteen feet square and a shed. The



Lace-making is the chief industry of the Paraguayan women. This handkerchief was made by hand, taking many days of work.

shed has no walls; it is merely an extension of the thatched roof which covers the closed room, and is upheld by poles.

The people live in the shed during the day. There are hammocks hung to the poles and men and women are sitting in them. Naked babies and half naked children play about on the dirt floor. The climate is warm in summer, and it is only the breeze sweeping through the shed that makes life endurable.

There is but little furniture. We see only a table and one or two chairs. The chief object of interest is a log standing on end. It is about as high as your waist; and there is a hollow in the top. Before the log a woman is standing. She has a heavy club in her hand, which she is lifting up and dropping on some corn inside the hollow. Such logs are the grist mills of Paraguay. In them the women pound their corn and manioc to flour. We find the people hospitable. They live simply and do not seem to care for anything except something to eat, a little liquor to drink, and enough cigars to smoke all the day through.

Now we are again on the train moving through the fields. What are those odd little hills which stand out like haycocks among the green grass? There are hundreds of them, dark-red mounds, spotting the fields and looking as though they had been thrown up by man. We are now passing some as high as our waists. A little farther on is a field in which there are thousands which would reach hardly to our knees. What can they be? They seem to be nothing but dirt. They are ant cities, each mound being an ant apartment house, as it were.

Paraguay has countless millions of ants which throw up such mounds all over the country. In some places there are so many that they destroy the pastures, and the people must fight the ants before they can cultivate the ground. Every hill must be dug out, for there are as many ants be-

Young Paraguayans. Behind the boys is a cart loaded with sticks for firewood. The climate is hot and most of the children go barefoot.

The oranges are brought to the river in ox carts. The cowskin is to keep the sun off the fruit. The oxen are yoked by the horns, and they pull along the load with their heads.

low as above ground. After that the hills are set on fire. They burn easily, and in this way the ants are destroyed.

The ants sometimes burrow into the houses. A woman may awake in the morning to find a great mound of dirt on her parlor floor, the ants having decided to build a village there. She sweeps out the dirt and deluges the brick floor with hot water. A morning or so later she may find the ants again besieging her dwelling.

But we are nearing a station. Get out your money for that crowd of women peddlers who are coming to canvass the cars. Here they are now. One has a pile of straw hats fitted one into the other on the top of her head. She will sell you a hat for fifteen cents of our money. There is a bareheaded girl with some cakes, each as large around as a dinner plate, and there are others with fruits and baby clothes and fine laces. Notice the lace handkerchief which that dark-faced little girl spreads out before you. It is as delicate as a cobweb and is made of fibers grown in the country. Lace-making is the chief industry of the Paraguayan women, and many beautiful things may be bought very cheaply.

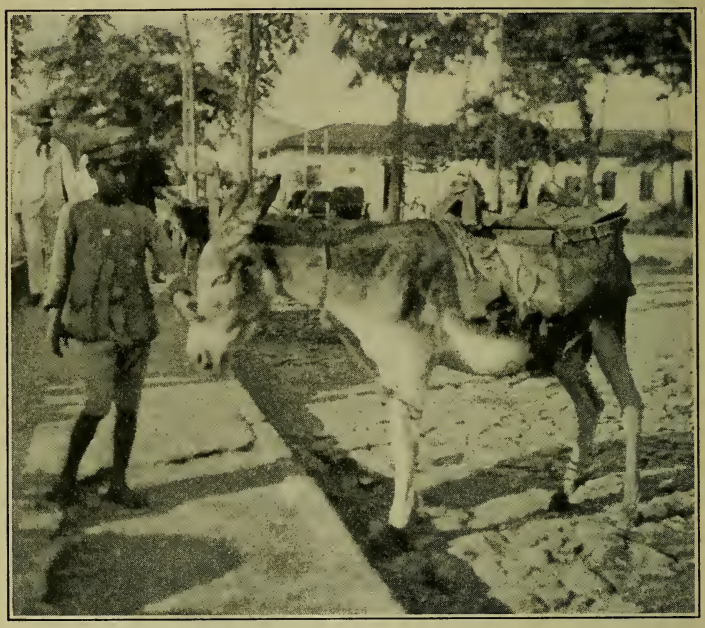
Let us get out on the platform and follow the crowd rushing toward the women squatted down on the bricks. They are peddlers, but their wares are too heavy to be brought into the train. Some are selling meat. Yes, selling beefsteaks at a station! They have baskets of raw beef before them and are peddling it out to the passengers.

The girls have cream-colored faces, dark eyes, soft black hair, and fairly good teeth. Nearly all are in their bare feet, and we have to be careful not to step on their toes with our heavy shoes as we stroll about through the crowd.

Here is a maiden with a lot of oranges piled up before her. Let us see how many we can get for a medio, or three quar-

ters of a cent of our money. I point to the pile and say in my poor Spanish: "Quantos naranjas por un medio, señorita?"

"Ocho," replies the girl as she puffs a volume of smoke out of her nostrils and hands me eight golden balls.



There are many donkeys ridden or led by boys.

We buy more and more oranges as we go from station to station, and find them as sweet as the best of our Florida fruit. They have a fine flavor. The skins are so full of oil that we can light with a match the drops we squeeze out on the surface.

Paraguay is above all the country of oranges. We see

the trees in every thicket, and they peep at us out of the forests with their golden eyes. The mud huts of the farmers stand amid orange groves and in some places there are so many oranges that they rot on the ground.

Oranges are sent by millions down the Paraguay River to Uruguay and Argentina. They are brought to the banks of the river from the orchards in ox carts so large that each will hold about five thousand oranges. The fruit is dumped out like so many potatoes, the drivers taking no more care in emptying their carts than when dumping dirt in repairing the roads.

During the season there are great piles of oranges on the banks at all the river towns, with scores of women kneeling before them picking up the fruit and putting it into baskets. As soon as a basket is full it is handed to a carrier, a woman who raises it to her head and balances it there, as she trots along over a board walk from the bank to the steamer. We often see a hundred women thus trotting along in single file. Each has a round basket filled with oranges on the top of her head. She walks rapidly over the springing boards without touching her hand to the basket.

The hold of the steamer is filled first and then a wire netting is stretched about the deck, making a fence as high as a man's head, within which the golden fruit is piled.

XXXV. MATÉ, OR PARAGUAY TEA

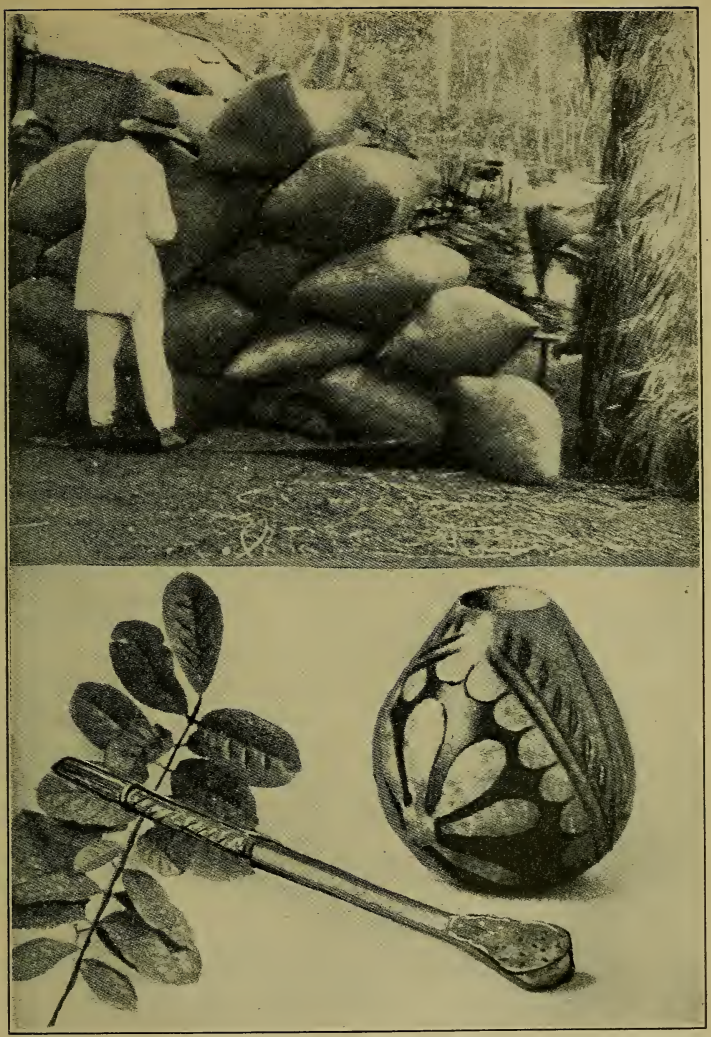
WE have returned from our trip into the interior and are again on our way to the north. There are boats twice a week from Asuncion to Villa Concepcion, and once every fortnight a Brazilian steamer calls at the Paraguay ports on its way into the wilds of southern

Brazil. We resolve to go first to Villa Concepcion, the chief port of northern Paraguay, and from there to make some tours through the forests on both sides of the river.

A short distance above Asuncion the Paraguay narrows. The scenes along it are of great beauty. The banks are well wooded, and now and then we see a clearing in which is a village with orange trees hanging above the thatched huts. There are more wild birds than there were farther south. Alligators are numerous, and if we rise before day we may catch a glimpse of a panther swimming across the river as they sometimes do about dawn. We pass the mouth of the river Confuso and come to land again at Villa Concepcion.

Here we see scores of men bringing bales of yerba maté (yĕr′bä mätā′), or Paraguay tea, down to the wharves and putting them on the steamer. Yerba maté is one of the chief exports of Paraguay and Brazil. It commands a high price in all South American countries south of the equator, and Paraguay produces enough every year to make a cup of tea for every man, woman, and child in the world. Maté was used as tea before Columbus discovered America. The Indians induced the Spaniards to try it, and it has now become the favorite beverage of many South American people. Argentina uses seven times as much maté as coffee and twenty-six times as much as Chinese or Japanese tea. Brazil, which grows more coffee than any other country in the world, raises and consumes a great deal of maté. The people of Uruguay and Chile prefer it to all other drinks.

But what is this tea that so tickles the South American palate? It is easy to learn. There is a woman on the steamer drinking some now. Our cabin boy will bring us a bowl if we ask him. It is served in a round gourd as big



Above — Maté packed for export.
Below — Maté leaf, bowl made of a gourd, and metal bombilla.

as a baseball with a handle fitted into the side, and one drinks it boiling hot. A spoonful of the powdered leaves is put into the bowl, the hot water is poured in, and the tea is ready for use. You do not put the bowl to your mouth, but suck the maté up through a tube. The tube is called a bombilla (bōm-bēl'yä). Sometimes it is of silver, sometimes of brass, and among the poorer people often a hollow reed. The metal tube ends in a bulb. This bulb is pierced with holes so that the tea is strained as you suck it into your mouth.

Here comes the boy with our maté. Be careful how you put the bombilla between your lips. The boiling tea has made it so hot that it may take the skin off. Wet your lips first and then try it. How bitter the tea is! At first drinking it does not taste at all good, but it is quite stimulating, and it will refresh one when tired. Many South Americans take nothing else for their early breakfast. If the Argentine gaucho has his maté in the morning he will gallop on horseback all day over the pampas and be satisfied to get his first meal when we are eating our suppers.

The plants which furnish the maté are low bushes which grow among the other trees. They are much like the holly bush and sometimes grow as high as a small orange tree. The leaves are green all the year, the younger leaves making the best tea. The people who gather the maté leaves chop off the small branches and bring them in bundles to camps in the forest. Here there are drying houses, each consisting of a framework with an arched roof of poles woven together and upheld by posts. Under the roof there is a floor of clay, so well hammered down that it is hard as stone. After the leaves are dried they are reduced to a powder. This is baled in skins and is the maté of commerce. About a million dollars' worth of such bales of tea are made

in Paraguay each year, and we shall see mule trains loaded with them making their way toward the ports.

There are many other interesting things in Paraguay, but the mail steamer is almost due at Villa Concepcion and we must hurry back if we would go on it north to Brazil.

1. Name the two sections into which Paraguay is divided. In what is it like Bolivia with regard to the sea?
2. How does Paraguay resemble Illinois? Florida?
3. What races are found in Paraguay? Compare the Indians with those of the Gran Chaco; with the Indians of the western United States.
4. What is the principal city of Paraguay? When was it founded? Describe your walk through it.
5. What are the chief things sold in the markets?
6. Compare the country scenes with those of the United States.
7. What fruit is most plentiful? Where does it grow in the United States?
8. What is yerba maté? How is it gathered and prepared for export? What other drink comes chiefly from South America? Where does our tea come from?

XXXVI. BRAZIL

LET us look at the map of South America and try to realize the enormous extent of Brazil before we begin to explore it. It is one of the largest countries of the world and it contains almost half of all the land of the continent. It is three times as large as the Argentine republic; it is larger than the United States, not including Alaska. If it could be lifted up and laid down upon our country it would extend from east to west as far as from New York to San Francisco and it would take in a large part of both Mexico and Canada. Its Atlantic

coast line is equal to that between Puget sound and Panama, and it touches every country in South America except Chile.

This great republic consists of twenty states and one territory. Some of the states are enormous and others compare in size with the smaller states of our country, although none is as small as Maryland. Amazonas, the land of forests and rubber, would make nine states as large as Kansas; Pará (pä-rä′), another great rubber land lying east of it, is ten times as large as Pennsylvania; Matto Grosso (mät′o͝o grōs′o͝o), a highland much of which is covered with pasture, is nine times as large as Illinois; and Goyaz (gō̤-yą̄sh′) is larger than Texas. Goyaz has rich farms and pastures, and it is said to have iron by the millions of tons. Minas-Geraes (mē′näsh zhā-rĭsh′) is rich in minerals, and like São Paulo (soun pou-lo͝o) it has vast plantations of coffee.

Brazil produces three fourths of the coffee of the world and a large part of the rubber, and it leads all countries in the production of cacao. It has more than two thousand tobacco factories and hundreds of sugar and cotton mills. It has tens of millions of cattle and many sheep, goats, and horses.

This vast territory is almost as varied in character as the United States. Much of it is made up of highlands and two fifths is an elevated plateau, the mean altitude of which is about that of our Appalachian Mountains. Upon the plateau there are peaks here and there that rise to a height of one and one half miles above the sea, and there is one that reaches nine thousand feet, being higher than any mountain on the eastern side of our country. The Amazon basin is larger than that of the Mississippi, a great part of it being lowland plains covered with forest.

Brazil is well watered. It has small regions of drought, but there are no great deserts like those of our western highlands, the Sahara in Africa, or the Gobi desert in Asia. The plateau of Brazil is cut by great rivers, the Amazon gathering more water than any other river of the globe. The waterways of the Amazon system, if they could be joined end to end, are long enough to reach around the globe, and their navigable length, if laid upon the United States, would form two canals clear across it from Cape Cod to the Golden Gate.

Brazil has a score of rivers outside of the Amazon basin, some of which are one thousand miles long, nevertheless almost unknown to us. The Parahyba (pä-rä-ē′bä) River is as long as from New York to Chicago, the São Francisco (soun frän-sēs′kō) is twice as long, and steamboats can sail on it farther than from St. Paul to New Orleans. The Paraná, the headwaters of which are in Brazil, has waterfalls that have been compared with those of Niagara, and at one place on the São Francisco the river drops two hundred and sixty-eight feet, or one hundred feet more than Niagara. Brazil is said to have waterfalls that could create over fifty million horse power, and in the state of São Paulo it is estimated that there is more than two million horse power in the undeveloped cascades.

Such a vast country must have many climates. The equator crosses the northern part near the Amazon, and the whole of the Amazon basin is in the torrid zone. At the far south the climate is temperate. Even in the summer month of January the thermometer seldom reaches one hundred, and in midwinter, which occurs in July, there is often snow on the ground. Moreover, the highlands give much of the country farther north a temperate climate, and in those regions grow wheat and corn.

Most of the lowlands are tropical and raise rice, tobacco, and sugar. There are large areas fitted for cotton, while several thousand feet above the sea are the greatest coffee plantations on earth. Brazil has vast grazing lands for the rearing of cattle. It has already many millions of cattle and will one day be a meat-exporting country.

The Amazon valley has forests which cover an area two thirds as large as the United States proper, and there are extensive pine lands in southern Brazil. The country is also one of minerals, including almost everything except coal, from gold and diamonds to iron and graphite, although the greater part of its mineral resources is as yet unexplored.

South America is sometimes referred to as a part of Spanish America. It would be quite as proper to call it a part of Portuguese America, for Brazil, which we have learned contains nearly half the land of the continent and almost one half of the people, was discovered and settled by people from Portugal. The Brazilians speak Portuguese instead of Spanish, which is the language of the other half of the continent. Rio de Janeiro (rē′ō dā zhā-nā′rō) is the largest Portuguese speaking city of the world, and Brazil has five times as many inhabitants as Portugal. The population is about one fourth as large as that of the United States, and it is rapidly increasing by immigration from Europe. The country has land enough for a very great nation, and it will some day have many millions more people than it has now.

The foreign commerce of Brazil is important, and its trade with the United States is rapidly increasing. We buy of Brazil more of its principal products, coffee and rubber, than any other country; and the ships bringing them to the United States should take back cargoes of goods made in our country. During the World War in Europe our

exports of machinery, railway materials, and manufactured articles were doubled, and we shall sell more and more to the Brazilians as that country develops its resources. They are buying our railway materials, electrical machinery,

and other manufactures; and we are investing much of our capital in Brazilian mines, cattle ranches, and factories of one kind or another.

Steamers sail regularly from the United States to Rio de Janeiro and Santos (sän'to͞osh), calling at Pernambuco (pĕr-näm-bo͞o'kō) and Bahia; also to Pará and Manaos

(măn-ä′o̱s), from which latter port there are smaller vessels going on up the Amazon to Iquitos (ē-kē′tōs) in Peru.

XXXVII. THE WILDS OF MATTO GROSSO

TO-DAY we are again moving northward on the Paraguay River. We have been traveling some time and are now in the wilds of southern Brazil. Our boat is winding in and out among the mountains, at the base of which are tall palms and fern trees. Now we pass forests so filled with vines and creepers that we can see only a few feet back from the banks; we could not possibly make our way into the interior without an ax or knife.

What is that furry face with the twinkling black eyes, grinning at us out of the branches, chattering and gnashing its teeth? That is a monkey. There are thousands of them in these forests. That great red and blue bird with a hooked bill as long as your hand is a toucan. There are other strange birds in the trees.

We see many wild animals. There is a white deer in the bushes. Those black things near the shore which look like logs are alligators. They have been disturbed by the waves of our steamer and are climbing out on the banks. Some are diving down into the water or swimming to get out of the way of our boat.

Look at the Indians on the other side of the river! They are half naked; they shake their spears at us as we steam on our way. This part of Brazil is full of wild men and there are more Indians than whites. Farther on to the west are vast regions which have no people but savages.

As we proceed the country grows wilder, save here and there where we pass little farms cut out of the forests.

Now our boats stop at one for fresh meat. The cattle are lifted on board by their horns. We get fish from the river and the small streams flowing into it. There are so many fish that one has only to explode a dynamite cartridge under

Monkey.

the water and dozens of fish, killed by the shock, will float on their backs all around the boat.

At the boundary of Brazil we pass Fort Corimbra, and soon after reach Corumbá, where we find the only customs house of this part of Brazil. While the steamer waits we visit the city, which is on a high bluff overlooking the river. It looks so much like Asuncion that we might think we

were back among the Paraguayans were it not that the language is new. These people speak Portuguese and for weeks we shall hear little else. It sounds much like Spanish but is harsher and not so melodious.

We are now traveling in Matto Grosso. The words mean "Great Forest" and the state is one of the wildest parts of Brazil. It has vast woods which have never been trodden by white men, and plains upon which thousands of wild cattle are feeding. The part through which we are traveling contains about the only white settlements, and Cuyabá (koō-yä-bä′), where we stop next, is its capital, the metropolis of interior Brazil.

Until recently the Paraguay River was the only easy route to Matto Grosso but one can now go there by railway from eastern Brazil. We are now on the height of land between the Amazon and the Paraná basins, and by a short journey we could reach some of the tributaries of the Amazon and sail down them to the ocean.

At present most traveling in Matto Grosso is done by water. Horses and mules are but little used, and away from the river we are offered bullocks for riding animals. We see men riding bullocks, and women sitting astride them like the men. Bullocks are used for plowing. They drag huge carts over the road and serve as pack animals. It seems strange when we first climb on their backs, but we find them good saddle beasts, their gait being a sort of pace.

We are surprised at Cuyabá. For such an out-of-the-way place it has many modern improvements. It has colleges and schools, electric cars, waterworks, and a cathedral. Sunday afternoons there is music in the plaza and we enjoy ourselves under the great palm trees, whose fanlike leaves move to and fro in the breeze.

The region about Cuyabá has fine farms, and many new

Indian boy of Matto Grosso. He wears beads and feathers solely for ornament. He stands on the skin and head of a jaguar.

The Falls of Iguassu, the Niagara of South America. They are situated in the tropics and the trees are green all the year. Niagara is often icebound in winter.

cattle ranges are being formed in different parts of Matto Grosso. The country has excellent grass and it will some day furnish much of the meat of Brazil. Some fine cattle have been introduced, among them the sacred bulls worshiped in India.

There is gold in the hills near Cuyabá and we are told that the boys of the city go out after a big rain and search for grains of gold in the streets which have been flooded by the streams from the hills, and are often well paid for their trouble. We look to see if we cannot perhaps find a stray golden nugget, but alas! there is nothing but sand.

XXXVIII. THE NIAGARA OF SOUTH AMERICA — SOUTHERN BRAZIL

WE have been traveling for more than a month since we left Matto Grosso. We sailed from Cuyabá south on the Paraguay River to Asuncion, from where we went by rail to Encarnacion and were ferried across the Alto-Paraná River to the town of Posades (pō-sä-dās′) in Argentina. The Alto-Paraná is the name given to the Paraná north of where it unites with the Paraguay. Posades is one of the ports and is the starting point for the falls of the Iguassu River (ē-gwä-sōō′), which might be called the "Niagara of South America." At Posades we took a steamer and made our way up the Alto-Paraná to the little town of Puerto Aguïrre near the boundary between Argentina and Brazil, where the Iguassu River flows into the Paraná after its mighty drop at the falls.

The Iguassu River rises in the highlands of eastern Brazil and flows for about four hundred miles westward before it enters the Alto-Paraná. We take carriages and ride

through the woods for a distance of ten or twelve miles before we arrive at the cataracts. We can hear the noise of the waters long before we reach them, and when we come out we behold a sight which reminds us of our own great falls at Niagara.

The Iguassu is now at the height of the flood season and a mighty volume of water is pouring down over the rocks. The falls are several times as wide as Niagara and they drop in a series of terraces or steps, one of which is much higher than our falls at Goat Island. The water goes over the rocks with a terrible noise and a mist rises high into the air and drops almost like rain.

The cataracts are surrounded by a dense vegetation, and a short ride from them will take one into tropical jungles. In the dry season the falls have a much smaller volume, but they are a valuable water power which eventually will be harnessed for electricity as are those of Niagara.

Leaving the falls, we go back to Posades and thence by rail through the rich Argentine province of Entre Rios to Buenos Aires, where we take a steamer and make our way from port to port along the Atlantic shores of southern Brazil.

Our first stop is at Porto Alegre (pōr-tō ä-lā′grā), the capital of Rio Grande do Sul (rē′ō grän′dā do͝o so͞ol). This state, like its sister states of Paraná and Santa Catharina (kät-ä-rē′nä), is devoted to raising corn, wheat, and meat. Its pastures are much like those of Argentina. It has cattle and sheep, and great meat-packing plants, and also establishments such as we saw on the Uruguay River, where hundreds of oxen are killed every day for jerked or dried beef.

Porto Alegre has public schools, colleges, newspapers, and stores. We are surprised to see that more than half

A pine tree of southern Brazil. There are many such trees.

the people are Germans. There are German clerks in the stores, and we meet German children everywhere on the streets. Southern Brazil is largely settled by Germans. They find the climate quite as temperate as that of the fatherland and make their homes here, just as many Germans have done in the United States.

The town is connected by railway with Uruguay and with other parts of southeastern Brazil.

1. Bound Brazil. Compare it with South America in size; with Europe; with the United States. How many states has Brazil? How many has our country? What is the size of your state? How many such states would equal Brazil?

2. Describe Brazil as to surface and drainage. What parts of Brazil have a temperate climate? Why? When is it summer in southern Brazil? When is it winter?

3. What language is spoken in Brazil? Why?

4. What are the chief products of Brazil? What do we sell to Brazil? What do we buy from her?

5. What are the chief routes from Brazil to Europe? To the United States? (See maps and Tables I and II.) Suppose you were ordered to leave home to-morrow for Rio de Janiero, how would you go? How far would you have to travel and how long would you be on the way?

6. Tell the story of our travels through Matto Grosso. Can we reach Matto Grosso by railway? Locate Cuyabá.

7. Where are the great falls of South America? Compare them with Niagara and with the Victoria Falls. (See Carpenter's "North America" and Carpenter's "Africa.")

8. What are the chief products of southern Brazil? Name the three southern states. How do they compare with Uruguay in products and climate? What European people are found there in great numbers?

9. Look up in your history the story of the discovery of Brazil; of Rio de Janeiro.

10. Name the chief rivers of Brazil. Compare them with rivers of the United States.

XXXIX. SANTOS AND SÃO PAULO

FROM Porto Alegre we steam northward along the coast of southern Brazil to Santos, enter a wide bay, and come to anchor at docks among vessels from the United States and Europe taking on coffee. Brazil produces most of the coffee of the world and Santos is the chief port from which it is shipped. The vessels which have just come in are unloading rice from India, codfish from Massachusetts and Newfoundland, cotton goods from Liverpool and Boston, and lumber from the pine lands of Maine. They will replace these cargoes with coffee, which will soon be on its way across the Atlantic to supply the breakfast tables of other lands.

Going on shore, we stroll about from one ship to another. What a strong smell of coffee surrounds us! The air is full of it and everywhere we look we shall see it in one shape or another. Motor trucks piled high with bags are coming in from the trains to the warehouses, and scores of negroes are unloading the carts and carrying the bags to the steamers. Each bag weighs one hundred and thirty-two pounds, but a man lifts it on his head and shoulders, and trots off as though he were carrying feathers. The warehouses are full of coffee. The bags are piled like so much cord wood, some of the rooms being packed from the floor to the roof. Not a few of the establishments have endless belts which carry the bags to a chute, down which they fly into the hold of the steamers, much as we saw the wheat loaded at Rosario. The work goes on rapidly, and during the harvesting season more than fifty million pounds of coffee are often shipped in one day. The larger part of this goes to the United States, our people taking more than one half of the crop raised in Brazil.

At the port of Santos, Brazil, the greatest coffee port in the world, scores of negroes carry the coffee bags to the steamers. Each bag weighs 132 pounds. This coffee is bound for New York.

Leaving the wharves, we stroll about the city. It is wonderfully clean and well kept. Its buildings are of several stories and painted in all the colors of the rainbow. There are great palm trees in the parks and plazas, and the homes in the suburbs have many tropical plants in their gardens. We take the electric street cars and ride out to the seaside resort of Guaruja (gwä-rōō'zhä). It is one of the finest of Brazil and is a famous summering place for the southern parts of the republic.

Returning to Santos, we take tickets for São Paulo, which lies on the plateau over the mountains about forty-seven miles away. The ride is delightful. The plateau is several thousand feet above Santos and its climate is that of the temperate zone. As we leave the station the train carries us through fields of bananas, the tall plants bending with their huge bunches of green fruit. We go by cocoanut trees and then on through a jungle of tropical vegetation, which becomes more and more dense in the foothills and on our way up the mountain. The trees are now loaded with orchids and other air-plants bearing exquisite flowers. They are bound together and wrapped around with creepers and vines, the whole forming a wall of green on each side of the track. The vegetation is so dense that we can see only a few feet through the trees.

The railway from Santos to São Paulo is a wonder of civil engineering. It crosses deep canyons and cuts its way through many tunnels. The rainfall is heavy and the roadbed is protected by gutters lined with cement. At the foot of the mountains the ordinary locomotives are uncoupled and the train is divided into sections of two cars each. Each section is now fastened by a steel rope or cable to a stationary engine at the station above, which winds up the cable, pulling our cars up the hills. When the cars reach

an altitude about a half mile higher than where we started they are on the plateau. The sections are again coupled and an ordinary steam railroad locomotive carries the train across the country to São Paulo.

We take taxicabs at the station and are soon riding through the second largest city of Brazil and the third in size on the South American continent. São Paulo is one of the wealthiest, most progressive, and most beautiful of all the cities south of the equator. It is the financial center of the coffee industry and the railway center of southern Brazil. It is also the capital of the state of São Paulo, one of the richest parts of the republic.

São Paulo is an old city. It was founded more than fifty years before Captain John Smith landed at Jamestown, but most of its houses are new and its buildings modern. It has wide, well-paved streets, electric cars moved by the waterfalls of the river Tieté (tē-ā-tā′), thirty-five miles away, and magnificent public buildings, theaters, and educational institutions. The city has one hundred and sixty public schools, which are about as good as our own. It has also a college, with teachers from the United States, which has pupils from every part of the continent.

We stay overnight at the hotel and upon rising go out for a walk. It is early morning and we meet many children on their way to school. Most of the girls are bareheaded and many wear dark-colored clothing. The boys have caps, coats, and knee-breeches, with their legs bare from their knees to their shoes, where their short stockings end. Each child has a bag of books in his hand. They are laughing and playing on their way to school.

Step out of the way of the street cars! They come in trains, one car following another until a dozen have passed. Some of the cars are loaded with freight. They are on the

way to the markets. They are second-class cars, used chiefly by the servants, for a man with a large basket or bundle is not allowed in the regular passenger cars. We see also many automobiles and can get taxicabs at low rates of fare.

During our stay in São Paulo we visit the department of agriculture, which has to do with the state of São Paulo, and there learn something about the enormous resources of this part of Brazil. The country has large cattle ranches, and upon the lowlands are raised tobacco, cotton, and rice. The highlands have great areas devoted to Indian corn, wheat, and beans, and, most important of all, to coffee.

XL. IN THE LAND OF COFFEE

BRAZIL produces more than two thirds of all the coffee used by man. This very morning there are millions of people in the United States who have had a cup of Brazilian coffee with their breakfast. We are great coffee drinkers and we ought to know about this part of South America, for most of our coffee comes from here and we are the chief customers Brazil has for this crop. Coffee grows best in a semitropical climate. The plants cannot endure frost, but at the same time they must not be spoiled by the heat. The climate of many parts of Brazil is just suited to them, and the best coffee regions are on the highlands west and south of Rio de Janeiro, which are from one to three thousand feet above the level of the sea. The best of all the coffee lands are in the state of São Paulo, where we now are. They lie several hundred miles back from the coast in a country which is gently rolling, and much

of which looks not unlike parts of the United States. The plantations cover but a small part of São Paulo. Altogether, they are not equal to half the size of the state of Massachusetts; nevertheless, they support more than seven hundred million coffee trees, and annually produce enough to give every man, woman, and child on the earth one pound of coffee and leave some to spare.

But let us take the train and visit some of the big coffee estates. Some of the largest of them are about Ribeirao Preto (rē-bĕ'ē-rōō prā'tōō), so far away from the city of São Paulo that it takes us almost a day to reach them by rail. We ride through rolling plains covered with grass, pass clumps of palms, and then go on through forests of hardwoods, the trunks of which are twisted about like corkscrews. The trees are bound together in a mat by the long vines and creepers which hang down from their branches. Now we pass a banana plantation, and now lemon and orange trees in the gardens by the side of the road.

This part of Brazil has not had rain for some weeks. A cool wind is blowing and the air from the plowed fields is loaded with dust. The boys who peddle fruit at the stations are covered with dust, and we find ourselves sneezing as it gets into our noses.

What queer dust it is! It is as red as a brick and it turns everything red. We are soon like so many Sioux Indians, our collars are red streaks around our dusty red necks, and our coats look as though they were sprinkled with cayenne pepper. There is red on the fences and on the trees and bushes. We see wide streaks of deep red cutting their way through the reddish green grass. Those streaks are the roads, for the ground under the sod is the color of brick.

This red land is the famous coffee soil of Brazil. Its

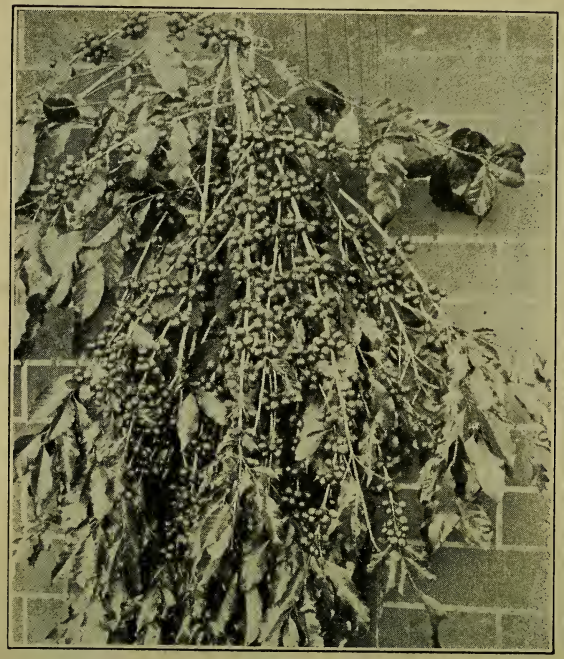
color comes from the iron mixed with the other matter composing it, and the redder it is the better the soil is thought to be for the raising of coffee.

The plantations begin about fifty miles from São Paulo, and from there we ride all day among hills covered with coffee trees. Most of the crop is grown upon large estates. The one we visit has about five million trees and is the largest coffee plantation of the world. It is so large that we could not go around the outside of it in a day, if we began walking when the sun rose and kept on steadily until dark. Railroad tracks have been built upon it from the factories to all parts of the estate, and we are carried from field to field on one of the little steam engines kept for hauling the crops.

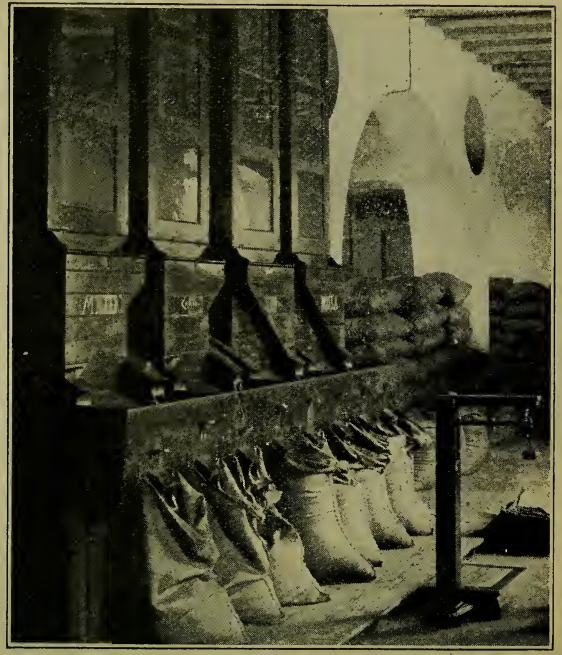
The ride is a beautiful one. About us as far as our eyes can see is nothing but coffee bushes. The whole land is covered with a mantle of green, striped here and there with bands of bright red. The green mantle is the coffee and the red stripes are the roads. The bushes are set out in regular rows and extend on and on, until they lose themselves in the sky at the tops of the hills in the distance.

As we proceed we can see the plants in their different stages of growth. In some fields they are not as high as our knees and in others they are three times as high as our heads. Here, men are plowing the fields, driving carefully through the green plants and turning up the red soil. There, boys are down on their knees pulling the weeds; farther on, a gang of laborers is laying out new rows among the stumps of the freshly cleared lands, while others are setting out coffee plants from the nurseries.

Five thousand people are kept busy on this plantation raising the crop and preparing it for the market, and we shall learn that a great deal of work is required to produce



The berries are like dark red cherries.



Coffee grading machines.

the cup of coffee we have at breakfast. Most of it comes from Brazil. In the first place let me tell you what coffee beans are. You have seen in grocery stores the ground powder and the green and brown coffee beans from which it is made. These coffee beans are far different from the coffee berries when picked from the trees. The beans are the seeds of the berries. You can see some of the berries on that bush over there. They are just like dark red cherries, and each is about the size of a marble. They hang in clusters close to the limbs among the green leaves. In each berry are two seeds, which form the coffee of commerce. There are smaller cherries at the ends of the branches. Some of these have only one round seed inside them. Those seeds are sold as mocha coffee, although the real mocha is supposed to come from Arabia.

How the seeds are gotten out we shall see later. Out here in the fields we must learn how the bushes are grown. In the first place, the land must be cleared and made fit for the crop. There is a great difference in the soils of Brazil, and one must have just the right kind of soil to raise coffee. The soil of this plantation is made of decomposed lava mixed with decayed vegetable growth. It contains potash, soda, and lime, and also oxide of iron and phosphoric acid.

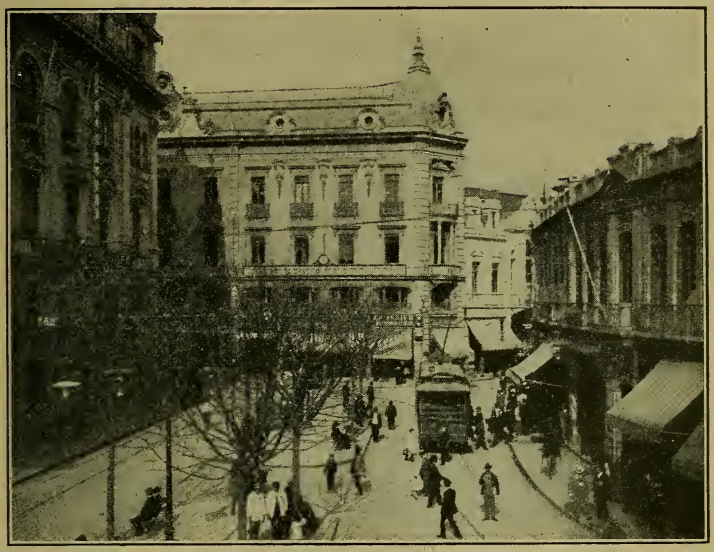
The beans to be sown are selected as carefully as the boys of our corn clubs select their seed corn. They are first planted in seed beds and soon sprout and little green plants shoot up through the soil. After a few months they have grown a foot high. They are now ready for transplanting to the fields. The plants are set quite deep in the ground. A little basin is dug for each one, and at first sticks or leaves are spread over it to

protect it from the hot rays of the sun. It is carefully hoed to keep down the weeds, and at the age of four years it begins to bear fruit. A good tree should produce three or four pounds of coffee a year, and in the rich coffee lands of southern Brazil, a tree will often bear crops for thirty years or more. The coffee begins to blossom in December, and in April or May the berries are ripe and the picking begins. Hundreds of men, women, and children may then be seen moving among the bushes, picking the ripe red berries into baskets, and carrying them to the cars which are to take them to the factories on the plantation.

On our way over the estate we see long rows of one-story houses and near them large buildings which look like machine shops. The small houses are the homes of the laborers on the estate. The big buildings are the places in which the coffee seeds are taken out of the berries and prepared for the markets. They contain the machinery which extracts the seeds, and near them are the drying floors, great fields paved with cement, upon which the coffee beans are dried in the sun after they are taken out of the berries.

But first let us see how the seeds are extracted. There are some berries which have just come in from the fields. Take up one and look at it. It is just like a cherry and almost as soft. Just inside the skin is a pulp and within this are two half-round coffee beans with their flat sides touching each other. Take out the seeds. They are white, not green like the coffee of commerce. Bite one of them and you will find that it has two skins. The outer one is white and like parchment, and the inner is as thin as the thinnest of fine tissue paper. The outer skin is called the parchment skin and the inner the silver skin, for it is much like silver spun out like a cobweb. Both these skins must be taken off before the coffee can be sent to our markets.

The first thing to be done is to get rid of the pulp. For this purpose the berries are thrown into a hopper, and run through machines that squash the pulp without hurting the seeds. By these machines the berries are reduced to a mush of pulp and seeds. The mush is now carried over



A street in São Paulo, Brazil. This is the metropolis of the coffee country.

a long copper cylinder in which there are hundreds of holes, each big enough for a coffee bean to pass through. As the mush falls upon the cylinder the beans drop through the holes and are carried into a little canal, from which they float off in great vats. They are next scoured clean in a tank in which a screw moves round and round among the beans, leaving them at the end as white as snow. The next

process is drying. The beans are spread out upon platforms and left in the sun for several weeks until they have become as dry as a bone. They are carefully watched at this time and covered at night and when it rains so that they may not get wet. Men stir them with wooden rakes so that they may be evenly dried.

Public school near São Paulo.

This requires great care, but it is by no means all that must be done before the coffee is ready for sale. Each little bean must be undressed, as it were. Its parchment coat must be taken off and its silver-skin underclothes removed so that it may be sent out in its olive-green nakedness to our markets. To do this the beans are thrown into machines that break the skins. They are next run through fanning mills by which the skins are blown out in the form of chaff, and the coffee seeds run out by themselves.

The seeds are of different sizes, some large and some small, some round and some almost flat. They must be graded before they are ready for shipment. This is done by passing them over a series of sieves in which are holes of different sizes, so that the grains of each size flow out through different pipes into bags ready to be shipped to the markets.

We spend some time in going about among the laborers on the estate. Many of them are Italians who have taken the place of the negro slaves, who were the coffee workers of Brazil a few years ago, and not a few come over the ocean only for a season, going back when the coffee is picked.

The plantation is carefully managed. It has its overseers, bookkeepers, and accountants, who try to see that nothing goes to waste. There is a large store where the laborers can buy food, and it has its own bakery, foundry, and sawmill. It is, indeed, a little world of its own, which has grown up here in the heart of South America to produce the coffee we drink at our meals.

XLI. A CITY OF SNAKES — SOME WILD ANIMALS OF BRAZIL

DURING our stay in São Paulo we motor out to Butantan to see the city of snakes. Yes, a city of snakes, a live flesh-and-blood city whose inhabitants are venomous reptiles! The city was built for the snakes. Its houses are of concrete. They are of the shape of old-fashioned beehives and of about the same size. The city is surrounded by a little wall of concrete and a deep moat of water where the reptiles can swim about. The snakes

are caught in the forests and brought here in order that they may be studied; also that their poison may be used to inoculate horses and thereby produce a serum or medicine, which forms an antidote to cure the bite of a snake upon human beings.

The institution makes medicine not only for snake bites but for diphtheria, lockjaw, plagues of many kinds, and various other diseases. It has already sent out many thousands of tubes of anti-snake medicine and has had tens of thousands of snakes of many varieties.

Such medicines are much needed in Brazil. The country has many poisonous snakes and there are hundreds of deaths from them every year. The snakes upon which the experiments are made are sent in by the farmers, each man receiving a tube of the serum for every snake he sends in. The horses inoculated with the poison are at first given very small doses, which are gradually increased. At the end of the year a horse may carry enough venom in his blood to kill two thousand horses that have not been treated at all. The blood of such a horse can be used to make the anti-poisonous medicine.

The director of the institution, who might be called the mayor of the snake city, takes us about and shows us its curious inhabitants. He tells us there are two families of snakes here which are very dangerous; one is the rattlesnake and the other the jararaca, the latter having a bite so poisonous that it will kill a man or animal within a few moments. He afterwards brings forth a mussurama, another snake which is not at all poisonous, but which is the chief enemy of the jararaca. The two snakes are of nearly the same size, each being about five feet in length. He tells us that the mussurama is a good snake, and allows us to handle it.

Later, the director puts the two snakes upon a large table to show us how the good snake is able to fight and kill the bad one. For a moment the two snakes appear to take no notice of each other. Then the mussurama makes a leap for the jararaca and grabs it by the neck just back of its head. The jararaca is not able to reach its enemy, for the mussurama keeps the grip on its neck. It holds the jararaca as in a vice, twisting it slowly from one side to the other until its neck is broken and it is practically dead.

It does not seem dead, however, for its coils keep twisting this way and that. The mussurama now loosens its grip on the neck, takes the head of the dying snake in its mouth, and begins to swallow it slowly. First the head disappears, and then, inch by inch, the body, until at last the whole of the jararaca has gone inside the mussurama, which darts out its tongue as though asking for more. The author has witnessed several such fights and in each case the bad snake was swallowed by the good one without any injury to the latter from its enemy's poisonous fangs.

As we continue our travels through Brazil we shall learn more about the snakes and other reptiles of the different parts of the country. The Amazon valley has the anaconda or water boa and the boa constrictor. The anaconda spends much of its time in the water and often lies coiled in the branches of trees above the streams, waiting to prey upon the wild animals which come down to drink. Stories are told of its killing and eating cattle, horses, and jaguars; but it probably eats only small specimens of these animals, its more common food consisting of rats, peccaries, birds, fishes, and reptiles. The author has the skin of an anaconda killed in the Amazon valley during his stay in South America. It is about twenty feet long, and the snake from

which it came was large enough to have swallowed a two- or three-year-old baby. The skin of one of the same species of snakes, which is twenty-nine feet long, is shown in the British museum at London. The boa constrictor is smaller than the anaconda, being seldom more than twelve feet in length. It is a beautiful serpent, having a brown skin changing to a brick red at the tail, with tan-colored spots on the back. It seizes its prey with its teeth and then winds its body around it, gradually squeezing it to death.

Brazil has many alligators, also turtles of enormous size. The coast and river waters swarm with live things, and it is said that the Amazon and its tributaries have almost two thousand species of fish. The country is full of insects and butterflies. There are seventeen hundred different kinds of birds, ranging from the great king vulture to the tiny humming bird, and including many kinds of parrots and the long-billed toucan. Some of the birds have beautiful feathers and they are caught and killed for their plumage, which is used to decorate hats and bonnets.

The wild beasts of Brazil are similar to those we have already seen in our travels. Many tapirs are found in the wilds, while jaguars and pumas infest the forested valleys. There are also foxes and raccoons, twelve species of opossums and six of porcupines, as well as sloths, armadillos, and ant-eaters. There are deer and wild hogs and more than fifty species of monkeys, some of which fill the forest with the noise of their howling. We shall see many of these animals as we travel up the great rivers and especially during our stay in the Amazon valley.

XLII. RIO DE JANEIRO

WE are again on board ship this morning. We have gone back to Santos and taken the steamer for Rio, and are now sailing into its wonderful harbor. We might have traveled from São Paulo to Rio by rail, but we wish to pass through this harbor, one of the most beautiful of the whole world. It has been compared to the Golden Horn at Constantinople; the author has seen both places and he thinks the Bay of Rio de Janeiro far the finer. The harbor is so large that all the ships of the world could be anchored in it at one time.

About the bay, just a little back from its shores, rise the Organ Mountains, covered with the rich green of the tropics. One of the hills looks like a hunchback, and the people have called it the "Corcovado" (kôr-kō̆-vä′dō̆ō̆), a Portuguese word meaning hunchback. Its top is more than a half-mile above the city and a little railroad goes up it. Another hill has a summit much like the round head of a man, the trees upon it resembling the hair on the head. Other forms remind us of battlements and forts; all together making a great wall of green about the harbor.

We enter at the smaller end of the bay, going in through a narrow channel between two forts. On one side of us is the "Sugar Loaf," a mountain shaped like a cone. It rises almost straight from the sea to a height greater than that of the Eiffel Tower at Paris. On the opposite side are islands so close that at a distance we fear we may graze the shore as we steam in.

Now we have passed through the entrance. We are in a land-locked sea, upon which scores of little islands are seemingly floating, and in front of us under the hills, resting apparently upon the water, is the red-and-white city of

A part of the bay of Rio de Janeiro, the Sugar Loaf Mountain in the background. The tree in front is a coconut palm.

Rio de Janeiro. It seems to be looking at us through the masts of the steamers anchored in front of the town.

Rio de Janeiro is one of the old cities of our hemisphere. It has grown up here because of its excellent harbor where goods can be landed easily and carried by railroad to interior Brazil.

Let us stop a moment before going on shore while I tell you its history. It is always important to know just what names mean, for from the name of a place we can often learn something of its origin. It is so with Rio de Janeiro. The harbor was discovered just ten years after Columbus landed in America. At that time navigators from the different parts of Europe were sailing across the Atlantic to find out all about the New World.

Among them were two men named João Manoel (zhō̤-oun′ mä-nwāl′) and Americus Vespucius. They sailed along the coast of Brazil in 1501 and when they came by the "Sugar Loaf" into the bay where we now are they thought they were entering a river and so called it "Rio," which in Portuguese means river. The day was the first of January, which supplied the latter part of the name — "River of January," Rio de Janeiro. It was afterwards discovered that it was not a river at all; for although about twenty small rivers flow down the mountains into the harbor, its waters are an arm of the sea.

About fifty years later the first settlement was made. The city was slow in growing. Bahia, farther north, was nearer Europe and for a long time much more important, and it was not until 1808 that the harbor of Rio was opened to the commerce of the world. It was then found to be a much better gate to southern and central Brazil and it became the chief port of the country. Since that time Rio has steadily grown and is now the capital of the republic.

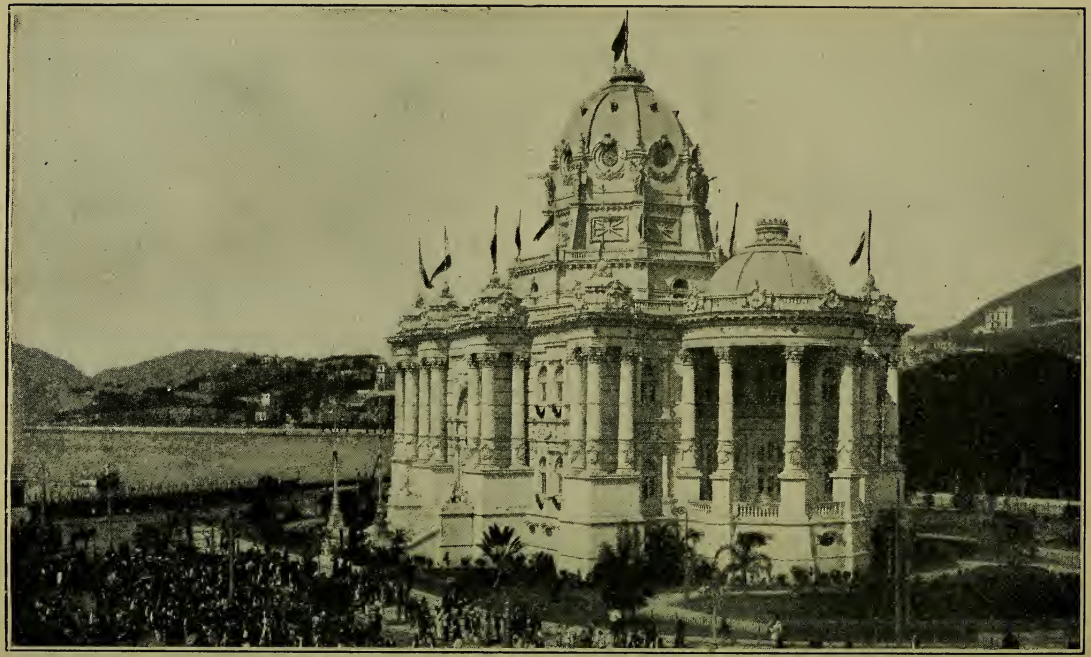
The main street of Rio de Janeiro is the Avenida Rio Branco. The pavement is of black and white stones laid in a pattern like mosaic. Rio has spent over $50,000,000 in public improvements.

It is next to Buenos Aires in size and importance among the cities of South America.

As we land at the wharves we are surrounded by steamers from Europe and the United States. Gangs of laborers, both negroes and whites, are busy loading and unloading boats. Some of the ships taking on coffee are from Hamburg, Liverpool, and Lisbon, and others are loading for New York, Baltimore, and New Orleans. There are many steamers discharging all sorts of goods for the city and the interior of Brazil. The vessel next ours is taking off a cargo of jerked meat from the beef factories of Uruguay. The meat is in bags and the men carry them out on their heads. Near by is a vessel from Maine filled with pine lumber, and next a tank steamer containing coal oil that a short time ago was under the ground in our Oklahoma oil regions.

Now we have entered the chief coffee-exporting section. There is coffee everywhere. The streets are walled with warehouses in which we see coffee piled up by the thousands of bags. We can hardly get along on the sidewalk on account of the men unloading the wagons and motor-trucks. Scores of half-naked men are carrying the bags into the warehouses, and dozens of negro women are down on their knees, sweeping the stray coffee beans out of the cobblestones of the street that they may wash and sell them again. The building at our right is a coffee factory, and that hum comes from the machines which are cleaning the beans for the market. Next door is the office of an exporting house which ships coffee to New York, and farther on are the commission houses which buy coffee to sell to shippers. The scenes remind us of Santos. The air smells of coffee, and we realize that we are in the second of the two great coffee ports of the world.

We have already learned how important the coffee crop



The Monroe Peace Palace was erected at the St. Louis Exposition to house the Brazilian exhibit, and afterwards removed to Rio de Janeiro. It is named after our President Monroe.

is to Brazil. It is the chief money crop of the country and almost half of it comes to Rio de Janeiro to be shipped. Here also are the stores which supply the coffee planters with goods, so that through coffee Rio de Janeiro has to a large extent become the great city it is.

We spend some time in the coffee section and then take taxicabs for a short ride through the city. Rio de Janeiro is too big to be seen in a day. It covers about nine square miles, extending from the harbor back to the hills. The streets go up hill and down. They cross one another at all sorts of angles, and we are unable to keep the points of the compass as we are whirled this way and that until we come to our hotel in the wide Avenida Rio Branco.

XLIII. MORE ABOUT RIO

WE shall take an interpreter with us this morning. The Spanish we have learned in the South American capitals will be of little use in Rio de Janeiro, for the people here speak Portuguese. Rio is the largest Portuguese-speaking city of the world.

We first motor through the city to get a general idea of its various features. The main street is the Avenida Rio Branco. It is more than a mile long and one hundred feet wide. It is paved with asphalt, and beds of flowers and rows of trees run through its center. Its wide sidewalks are made of black and white flint laid in patterns, and back of them are magnificent stores and office buildings lining the street from one end to the other.

From this avenue we pass into other magnificent boulevards, upon which are beautiful buildings, and we are told

that the greater part of Rio de Janeiro has been torn down and rebuilt within the past few years. The city is now one of the finest of the world, and has many miles of drives lined with narrow parks filled with tropical trees and flowers. It was once a pest hole of yellow fever and other tropical diseases, but it is now kept very clean. It is one of the most healthful cities near the equator.

We spend some time in the business parts of the city. There are well-dressed men everywhere. Rio has many rich citizens and the streets are thronged with buyers and sellers. The crowd is a strange one and contains people of all the nations, including our own. We see the faces of Italians, Portuguese, Spaniards, French, Brazilians, and English. There are professional men dressed in black with tall hats, and merchants in business suits of white linen. There are Italian vegetable peddlers with baskets fastened to poles on their shoulders, and half-naked porters with loads on their heads. There are bareheaded women and smartly dressed boys moving to and fro, forming all together such a human mixture as you will see nowhere else upon earth.

Now we have left the business section and are passing through the side streets. How many peddlers there are! Nearly all the hucksters of Rio carry their vegetables, fruits, and fish from house to house on their shoulders or heads instead of in carts or on donkeys. Here comes a man selling fish. He has two baskets fastened to the ends of a pole resting on his shoulders. Behind him trots a man loaded down with long strings of onions. He has stopped at that house over there and is selling a string to the cook.

There is another queer character. I mean the man on the opposite side of the street who is clapping two sticks together. The door opens and a woman asks him to enter. That man sells dry goods and notions from house to house.

His sticks are a part of his yard measure and that clapping is a sign of his trade. Many of the women do not like to go to the stores, preferring to buy their goods of peddlers like him.

And so we go on, now accosted by boys selling papers, and now by peddlers with candies and fruit. The strangest sights of all are the porters who carry huge loads on their heads. There goes one with a box that must weigh two hundred pounds. Behind him is a group of eight negroes who are moving along with a huge crate above them. The crate contains a piano and they are carrying it on their heads from one part of the town to another.

How many of the people are barefooted! Most of the working classes wear no shoes or stockings, and we see barefooted carpenters and masons going about clad only in hat, shirt, and trousers. The common clothing is cotton, for Rio is warm.

Here are some children going to school. Some of them carry portfolios and some have bags for their school books. The girls are bareheaded and barefooted. Some of the boys wear hats or caps. It is only the children of the well-to-do who wear shoes.

We visit the market. It lies on the edge of the harbor so that the fish and vegetables can come in by boat. The buildings cover six or eight acres, forming a little market city which is divided by streets into blocks, each of which has its own merchandise. One block may be devoted to vegetables and fruits, another to meat, and another to butter and cheese. One is taken up by the sellers of live animals. Here are cages of dogs, large and small, and pens filled with rabbits and guinea pigs. There are also cages of monkeys and birds. Some of the monkeys are as big as a collie dog and others not so large as a kitten just born.

Going to school in the capital of Brazil. A photograph taken by the author on a side street of Rio de Janeiro. The weather is so warm that bare feet are a luxury.

The smallest are called marmosets. They are a sort of squirrel monkey, and have long tails and tufts of gray hair over their ears. We can buy a pair for two dollars. There are also screaming parrots and parrakeets and sweet-singing birds.

During our stay in Rio we visit the Monroe Peace Palace named after our President Monroe, which stands at one end of the great Central Avenue, and then drive out to the parks. The parks are everywhere in and about the city, and we can tell their locations by the royal palms which rise high above the rest of the vegetation, and with quivering branches wave us an invitation to enter. We are in the tropics and the plants of our hothouses are to be found here growing wild.

We take a street-car and ride for seven miles along the bay, by the residences of rich Brazilians, to the botanical garden. This has plants and trees from all parts of Brazil. It has some of the most wonderful palms of the world. As we enter the gate we come into an avenue of palms, each as high as an eight-story house, although not more than a yard in diameter at the ground. There are more than a hundred of these magnificent trees walling the avenue. They are symmetrical shafts of silver gray that shoot out at the top into a canopy of fernlike green leaves. The avenue is not wider than an alley, and we seem to be walking between two files of giant soldiers, the plumes on their hats quivering in the breeze high above us and almost shutting out the blue of the sky.

Later we make tours over the little railroads which run from Rio de Janeiro up into the mountains. They are just like the ones we have on Mount Washington and Pikes Peak, and one way up the mountains is through wonders of tropical scenery. We go over ravines hundreds of feet

deep and crawl about mountain walls more than a thousand feet high. Now we seem to cling to the sides of the rock and again high walls of rock hang over us and we tremble as we think they might fall.

The air here is moist and at times we are riding through clouds. As we go higher we have magnificent views of the city and harbor, and on the top of the Corcovado, we stand upon a rocky peak amid some of the grandest views of the world.

The great city of Rio and its beautiful harbor are just below us but so far down that the houses look no bigger than dog kennels, as they lie there skirting the water. The sea beyond has become a bed of sapphire under the rays of the sun, and upon it are rocky islands of curious shapes, while all about rise mountain upon mountain and hill upon hill.

See those four ocean steamers sailing in single file by the "Sugar Loaf" out to the sea. They look like canoes at this distance, but they are really great steamers loaded with coffee for New York, Liverpool, Havre, and Auckland, New Zealand. The last vessel will pass through the Strait of Magellan and go almost half around the world before it reaches its haven.

1. What is the chief business of Santos? Trace a cargo of coffee from there to New York; to Hamburg; to Naples.

2. Locate São Paulo. For what is it noted?

3. What are the chief coffee countries of the world? Of South America? (See Table XIV.) From what country do we get most of our coffee? Describe a plantation. Tell how the plants are grown and the seeds prepared for the market. (See Carpenter's "How the World is Fed," chapter 41.)

4. Mention some wild animals of Brazil. Tell about your visit to the city of snakes. Why was it established?

5. Locate the capital of Brazil. How did it get its name? Describe its harbor. Mention one of its chief exports. If you

An avenue of palms 100 feet high, which are as straight and uniform as telegraph poles, with plumy tops like parasols.

Bahia is the third city in size in Brazil. The town is on a high bluff with the harbor below.

had your choice of the goods in the market what would you take?

6. Take a motor trip through the city and tell what you see.

7. What public building of Rio was named after one of our presidents?

8. Trace each of the four steamers mentioned to the port for which it is bound. How far is it from Rio de Janeiro to New York? To Liverpool?

XLIV. BAHIA

WE are in Bahia to-day. For three days we have sailed north from Rio de Janeiro on our slow coasting steamer and have come to anchor in the great "Bay of All Saints," under the bluffs on which most of the city is built. These bluffs rise for two hundred feet almost straight from the water, having only a narrow strip of land between them and the sea. Upon this strip are the wholesale importing and exporting houses and on the bluff are tall, bright-colored buildings shaded by feathery palms that quiver in the breeze. The bluff is so abrupt that electric elevators have been built to take the people from one part of the town to the other, for it is difficult to climb the steep roadway up the hills.

Bahia is almost as large as Seattle, and is the third city of Brazil. It has a fine harbor with a beautiful driveway along the shore and broad asphalt highways on the bluffs. The town is of great commercial importance, having fine stores and great factories. It is progressive and is noted for its hospitals and schools.

The bay is one of the best harbors of all South America. It has an entrance three miles in width, and the harbor has been improved by breakwaters and quays costing many

millions of dollars. It is equipped with electric cranes and all modern landing facilities. The principal imports are coal and coke, iron and steel, wheat and flour, dried codfish, machinery, and cotton goods. The chief exports are cacao, tobacco, coffee, rubber, and manganese.

There are now more than a score of ocean steamers, many coasting ships, and hundreds of small boats at anchor in the bay. The vessels have swung with the tide and their prows are turned toward the city, so that we can easily imagine them a great naval fleet coming in to capture Bahia. Bahia is one of the oldest South American cities. More than half a century before Boston was founded it had fifteen thousand people, and for two hundred years thereafter it was the capital of Brazil. It continued to lead until coffee began to be raised farther south, when Rio de Janeiro and São Paulo surpassed it.

For many years Bahia was the chief center for the slave trade of Brazil. It was the port nearest Africa and the negroes were kidnaped and carried across the Atlantic into this bay. So many were brought that by the year 1800 more than half the people of Brazil were slaves. That was not a long time ago, and as we land upon the wharves we notice that there are far more colored people than whites in the lower part of the city. Negro women go about peddling bananas, or sit upon the streets with piles of fruit about them; negro men are loading and unloading the steamer, carrying huge bags and bundles on their heads; and in the narrow side streets little black babies, almost as naked as when they were born, are crawling over the cobblestones. There is a boy of eight playing horse. He has a little stick between his legs and is going on the gallop, although he has not a stitch of clothing on him.

Here come three Africans now. Listen to that laugh.

It reminds us of the jolly good nature of our dark-skinned Americans. Let us stop here on the corner and hear the fun as they pass. That man on the left has said something funny and his fellows are shouting with laughter. Why don't we laugh? He is speaking quite loudly, but though we hear what he says we cannot see the joke. He is speaking in Portuguese, the language used by both colored and whites in Brazil.

Negro women go about peddling bananas.

As we continue our travels through Brazil, we see that the races have intermarried to such an extent that it is hard to tell who are whites and who are mulattoes. The negroes have equal rights with the whites. Many of them are intelligent and not a few hold important positions. There is no such prejudice against the colored man as is found in our southern states. We meet negro men and women at almost every hotel table, and in the dining

room of the steamers there are as many colored people at the table as whites.

We stop during our journey around the harbor to buy some oranges of an old negro woman. They are navel oranges, like some of the finest and sweetest we have from California. As we eat them we are reminded that our navel oranges came from Bahia in the shape of a little tree that was taken from here to the city of Washington, and planted in the botanical garden there more than a half century ago. From this tree grafts were sent out to California and started the first navel orange orchards, the fruit of which now sells for many millions of dollars.

We spend some time in Bahia visiting its cotton and tobacco factories. The tobacco is excellent and a great deal is exported. In the lower part of the city we see cart-loads of hides and bales of goatskins brought from the country. They are to be shipped to America to be made into shoes.

In going through the factories we learn that Brazil is rapidly developing industries of many kinds. The republic is agriculturally and minerally rich and it has almost all the raw materials needed for manufacturing. The chief trouble is the lack of fuel to make steam. So far, no large deposits of coal have been found, but the country has a vast amount of water power which will some day be used to generate electricity. The great rivers of the eastern highlands pour down over the rocks on their way to the ocean, and many of them are now lighting cities and towns, running street-cars, and supplying the power plants of various industries.

Rio de Janeiro is lighted by a little river in the Organ Mountains. São Paulo gets its electric power from the falls of the Tieté River, and not very far from Bahia are

We are reminded that our navel oranges come from Bahia.

the falls of the Paulo Affonso (äf-fôn'soo͝), which could generate two million horse power. The Paulo Affonso falls are on the São Francisco River, about one hundred and fifty miles from its mouth. They are two hundred and fifty miles from Bahia, where we now are. The river has five branches, which unite above the falls and then take a mighty leap over the black rocks of the cañon. The country surrounding the falls is such that it may one day be a great cotton plantation with spinning and weaving mills run by this power.

We have already seen the falls on the Iguassu River in southwestern Brazil.

The Amazon and its tributaries have fourteen large waterfalls having enormous electrical possibilities, and the same is true of many other rivers of Brazil, the names of which hardly are known outside the republic. Altogether, there are said to be fifty-one great waterfalls, which are capable of producing fifty million horse power, an amount equaling the consumption of hundreds of millions of tons of coal every year.

These waterfalls will probably be used to run the railways in the future. Brazil is next to Argentina in the length of its railways; although as yet it has vast territories which have no such transportation. The country is as large as the United States proper, but we have sixteen miles of railway where Brazil has but one. New roads are rapidly building, and vast tracts of new land are being thrown open to settlement.

The area of unexplored land is reduced each year by rubber hunters, scientists who are studying the plants of the Amazon valley, and new settlers. Brazil has encouraged immigration and there are thousands of Spaniards, Italians, Portuguese, and Germans in the country.

XLV. THE MINES OF BRAZIL — DIAMONDS, IRON, AND GOLD

A LARGE country like Brazil is sure to have many minerals. We appreciated how true this is when we visited the government department of Rio de Janeiro and talked with the geologists. They told us that more than six hundred million dollars' worth of gold had been taken out of Brazil prior to 1820 and that one half of this came from the one state of Minas Geraes. We saw some gold when we were traveling through Matto Grosso, and we learn that gold is still washed from the tributaries of the Amazon. Brazil has some of the chief iron ore beds of the world. Iron is found in every state and there are billions of tons in deposits which will some day be developed. The best iron mines so far discovered are in Minas Geraes, the same state from which most of the gold has come. They lie on the high plateau, several hundred miles from the seacoast and at such a place that the ore can be sent down to the steamers by gravity.

In the state of Minas Geraes are the largest deposits of manganese of the world. Manganese is a metal used to mix with copper, iron, and other metals to make them stronger and more elastic. We imported a great deal of manganese from Brazil during the World War for the making of steel for our arms and munitions. We use it also in glass making and smelting.

Brazil has many precious stones, among the most important of which is the diamond. Until the South African diamond mines were discovered, this country was furnishing many of the world's finest diamonds. They came from Diamantina (dyä-män-tē'nä), in Minas Geraes, where dia-

mond mining is still carried on. One of the stones was the "Star of the South," another the "Green Diamond of Dresden," and a third the "Star of Minas." All were famous stones, and each was worth many thousands of dollars. The diamond regions are far back from the seacoast and more than a mile above sea level. The stones are found in the gravel of the streams and sometimes in a blue clay deposit several feet thick. The South African diamonds also are found in blue clay.

As far back as 1732 thirty thousand men were searching for diamonds in Brazil and many million dollars' worth of fine stones were found and sent to the markets. At first the work was done largely by negro slaves under guard, and any slave who found a gem of eighteen carats got his freedom. Later, diamonds were found in Matto Grosso and at the headwaters of the Paraguassu (pä′rä-gwä-sōō′) River some distance inland from the city of Bahia.

The diamonds of the latter region lie in the gravel on a bed of clay at the bottom of the river. The stream is deep, and the mining is usually done where there is not more than twenty feet of water and where, owing to a bend in the river, the current is not strong.

A long pole is first driven down into the bed of the stream. Two miners in a dugout canoe then row out to the pole. One man remains in the boat and the other, who is naked, dives to the bottom. The diver carries a big bag, the mouth of which is held open by an iron hoop. He rests the hoop on the river bed and scrapes the gravel into the bag. When it is filled he climbs with it up the pole to the boat. He goes down again and again for more gravel and when the boat is loaded, it is rowed to the shore and its contents carried to a pile some distance from the water. The work is continued as long as the river is low, the washing of the gravel

being done in the wet season when the floods prevent mining. At that time the gravel is picked over for carbons and diamonds and often many bushels of gravel have to be washed before a single stone of value is found.

The work requires great care and patience, but one little stone may give the miners a large reward for a whole season's work. When the mines were at their best only about one diamond a week was discovered, but the few which were found brought in a million dollars a year for many years.

Almost all the diamonds now being discovered in Brazil are small. They are shipped to Europe to be cut for jewelry or made into tools to cut glass or polish other hard stones.

Carbons are black diamonds which are used for fine boring machines and for polishing hard substances. They are about as hard as diamonds but more porous. They are found in all sizes, from little ones as small as a grain of sand to some weighing hundreds of carats. A carat weighs so little that it takes one hundred and fifty of them to make one ounce troy. It is the measure of weight for precious stones and is therefore used for carbons. Not long ago carbons were selling for twenty dollars a carat, or so much that one large carbon brought twenty thousand dollars.

XLVI. ALONG THE COAST OF BRAZIL

OUR travels for the next few weeks are to be along the coast of Brazil. We have taken a little Brazilian steamer at Bahia for Pará, the great port at the mouth of the Amazon. The distance looks short on the map, but it is more than fifteen hundred miles, and as we shall move slowly along from port to port, stopping a day at each

Our first stop is at Pernambuco, the city of the reef. A natural reef of rock extends into the sea and forms a breakwater with a good harbor behind it. This is one of the chief cotton ports.

principal city to load and unload, it will take several weeks.

Our first stop is at Recife (rā-sē′fā) or, as it is sometimes called, Pernambuco. It is the chief port and capital of the state of Pernambuco. The word "Recife" means reef, and this is the city of the reef. We see why as we enter the harbor, which is formed by a reef or tongue of rock that extends from the shore two or three miles out into the sea, half inclosing a space about a mile wide and so deep that ocean steamers can come in and lie safely at anchor. The rock extends out like a wall and we can hardly imagine that it was not all built by man. It does not rise high above the level of the ocean, but its height is sufficient, with the addition of the low wall erected upon it, to prevent the waves from coming into the bay. As we enter there is a heavy wind from the east, and the waves seem to gnash their teeth as they throw themselves against this stone wall, sending up masses of snow-white foam in their anger. Our ship has been rolling about on the ocean. Inside the harbor we lie perfectly quiet and there is hardly a ripple, notwithstanding the billows outside.

Recife has spent many million dollars in building jetties and breakwaters, and it is now a fine port. It has electric cranes to unload merchandise, and almost a thousand steamers call here every year. It is the first port at which the European steamers stop after leaving Lisbon.

The state of Pernambuco is a little larger than New York. It produces more cotton and sugar than any other part of Brazil, and it has many cotton and sugar mills. The cotton plantations are increasing in number and size, and they may some day compete with those of our cotton belt. There are railways connecting the interior with the coast ports.

We land and take street cars, being carried over one bridge after another. We pass motor trucks loaded with cotton, carts pulled by oxen in shafts, and on into the city. Recife has many canals, and its bridges remind us of Venice. Some of the buildings are faced with porcelain tiles imported from Europe. Its people pride themselves on their enterprise and business ability.

At Parahyba, still farther north, we have a chance during the delay of the steamer to take a railroad ride into the interior. The train takes us through groves of coconut palms and by plantations of cotton and sugar. The vegetation is dense in many places and we see strange birds and animals in the trees. The parrots screech at us, and the marmosets, so small that we could easily carry one in a pocket, scamper about through the branches.

Farther back from the coast are the highlands of Brazil, and a little farther north in the state of Ceará (sā-ä-rä′), at the port of which we next stop, the country is almost all high. It is a rolling land as big as Ohio, with mountain chains running through it.

This part of the Brazilian highlands is often subject to droughts. When there is plenty of rain the crops are rich and everything is green and fresh, but during a long dry spell everything is as bare as the desert of Sahara. Such times do not often occur, but when they do many of the people starve, and in the drought of 1877 and 1878 more than half the entire population died of famine.

The port of Ceará has one of the worst landing places on the east coast of South America. There is no pier, and we are carried from our ship to the shore in the arms of half-naked men, who charge us each eight cents a trip. The waves are rolling in on the beach as we go along suspended only a few inches above the water, and

we tremble at what might happen if our bearers should slip on a stone.

Ceará is a beautiful city of seventy thousand or more. It has bright-colored houses, clean streets, and well-dressed people. We visit the market to learn what is raised in the country. We then take donkeys and ride through the city, with time for a jaunt in the suburbs.

The street scenes are interesting and every turn brings a new picture. We pass men and women carrying all kinds of things on their heads. There is a barefooted negress walking briskly along with a pumpkin so delicately balanced on her head that it does not roll off, and behind comes a boy carrying a two-bushel bag of flour the same way. He has stopped there at that fence and without lowering his head or touching his burden has lifted his leg to the first board. He seems to be searching for something that is biting him.

Here comes a water peddler driving a donkey, to the sides of which are slung four five-gallon casks. Behind him is a man with two horses, each of which carries a load of wood. The wood is fastened to the sides of the horses by wooden hooks made of forked limbs tied on like a pack saddle.

Now we have left the city and are out in the country. We ride by banana fields, orange trees, and palm groves; also fields of cotton and sugar cane. There is one palm growing wild in Ceará that produces more things, perhaps, than any other tree in the world. This is the carnauba (kär-nou'bà) palm. Its trunk is used for rafters and building material, and from its roots a medicine is made. When young, it is eaten as a vegetable, and from it wine and vinegar are made, as well as a starch like sago. The fruit is a good food for cattle, the pulp having an agreeable taste, and the nut is used as a substitute for coffee. The pith of

the carnauba is as light as cork, and musical instruments are made of the stem. When tapped, the tree gives forth a white liquid much like coconut milk. Hats, brooms, and baskets are made of the strawlike bark on its trunk, and the bark is used also for thatching houses. From the leaves a wax is obtained that is manufactured into candles which are extensively used in the states of northern Brazil. Ceará produces as much as two million pounds of this wax in a year.

Ceará is noted also for its parrots, which are famous as talkers. They are of a beautiful green and blue color with a bit of red on the wings and neck, and they are smaller than most other parrots. We see some in the markets. The price is only two dollars per bird, but alas! the parrots speak Portuguese, and before we could enjoy them they would have to be taught a new language. We take several with us on the steamer, however, and amuse ourselves during the rest of the journey by giving them lessons in our own American tongue. We are now only a little south of the equator and the weather is hot, although the sea breeze makes us quite comfortable. We sail on for a day or so, moving northwestward, and come to anchor at last at the city of Pará in one of the mouths of the Amazon.

1. Describe Bahia. Compare it in size with Rio de Janeiro; with Pará; with Pernambuco. Why was Bahia the chief port for the slave trade? Mention its principal industries. What fruit did it give California?

2. Locate the São Francisco River and the Paulo Affonso falls. Why are the water powers of Brazil very important?

3. What minerals are found in Brazil? Locate Minas Geraes. What is manganese? What country of Europe has great supplies of this ore? (See Carpenter's "Europe.")

4. Where are the richest diamond fields of Brazil? Of the world? How are the diamonds mined? Compare diamond mining in Brazil

with that in Africa. Find out all you can about these precious stones. (See Carpenter's "Africa," and Carpenter's "How the World is Clothed," chapters 37 and 38.)

5. Describe the harbor of Pernambuco. Why is the town called Recife?

6. What crop of this region may some day compete with an important product of our southern states?

7. From what Brazilian tree are candles made? Make a list of other useful things that come from this tree.

XLVII. THE KING OF RIVERS

BEFORE we begin our travels up the Amazon let us consider the wonderful region into which we are going. The Amazon is the king of rivers and flows through the greatest valley of the world. The basin it drains is two thirds as large as the United States. The headwaters of the river are gathered from a curve of the Andes two thousand miles long. The basin is as wide as the distance from New York to Salt Lake City. The divide on the north is the highland of Guiana. On the south it is separated from the basin of the Paraná by a gentle rise in the plain.

At its back are the great Andes, and from the foot of these mountains the basin slopes downward to the sea so gradually that, in this long distance of about two thousand miles, the fall is only two hundred feet. This is so little that if the Amazon valley were free from trees and we were riding over it in a wagon it would appear to be a level plain. The fall is only a little more than an inch to the mile, and for several hundred miles from its mouth much less than that. We might take ship on the Amazon and travel up it farther than from the Atlantic to the head of Lake Superior, and

A home and boat landing on the Amazon. The tide from the ocean runs up the river a thousand miles, and is liable to lift boats suddenly and break their moorings.

we would then be not over forty feet higher than when we started.

The fall is so gentle that you would hardly think the water would flow, but it does in such a mighty volume that it carries with it vast quantities of the earth washings of the mountains. Millions of huge motor trucks working day and night could not haul down the mud that it is daily carrying into the Atlantic.

There is so much of this mud that it makes the ocean yellow for one hundred miles out from the shore, and for a day before we arrive at Pará we are sailing through water almost as thick as pea soup. Indeed, bits of tree trunks and vegetation from the Andes are often seen floating four hundred miles from the coast; they have traveled from their homes in the mountains as far as the distance across our continent. Is not this a wonderful river? What can be the cause of such a great volume of water that keeps on flowing day and night, year in and year out, from one lifetime to another?

Now let us see whence this perpetual flow of fresh water comes. It is brought here by the constant trade winds that start from the shores of Africa, and as they cross the Atlantic are filled with moisture. When they reach Brazil they are loaded with water, and as they rise and cool in their journey to the mountains, up the wide trough of the Amazon valley, they drop this as rain. They drop more and more as they go on to the westward, and the water falling over this vast surface is carried by countless streams into the channel of the Amazon River. So much water falls that the Amazon valley is one of the rainiest regions of the world. There is so much rain, indeed, that if the mouth of the river could be held back by a great dam, like that at Gatun, a vast sea would soon be formed. It

is estimated that so much rain falls in a single year that, if it remained where it fell, the valley would be covered with water to a depth of eighty inches, which is greater than the height of the tallest man.

As we stand on the deck of the steamer we observe that the air is full of moisture. Pará has a heavy rain almost every afternoon and its people make their appointments to call after the daily shower. We shall find the air moist all the way to the Andes, and we must wipe off our knives, cameras, and guns every day to keep them from rusting. The air is so wet that a gun loaded overnight will not go off in the morning.

Fortunately for us, the great river is now at its lowest stage. For almost two thousand miles from the sea it is from two to five miles in width. During the rainy seasons of November and February it slowly rises to from thirty to fifty feet above its present level. It then floods much of the valley and thousands of square miles are covered with water. The river flows in and out among the treetops, and for hundreds of miles back from the ocean, the valley is a great inland sea from fifteen to one hundred miles wide. In the dry times there may be seen vast stretches of meadows, where the water lies so long upon the land that trees will not grow. The pasture fields of the Amazon are the result. Most of the valley, however, is a forest, in which there are no paths and through which we can go only in boats. There are so many streams that most parts of the forest can be reached by them. The Amazon in its long course receives more than one hundred rivers, into which flow myriads of smaller streams. Of its rivers, eight have a navigable length of more than one thousand miles each. On the Rio Negro one can go to the north until he is very near the headwaters of the Orinoco — so near that he could carry

his boat to them and float down to the Atlantic Ocean. On the south he could go up the Tapajos (tä-pä-zhōsh′) so far that by a short trip he could drag his canoe into the tributaries of the Paraguay and Paraná, and paddle down to Buenos Aires or Montevideo.

The Amazon system is the greatest river system of the globe, and the river itself will surprise us more and more as we travel upon it. We are now at the port of Pará. We shall go in a big ocean steamer to Manaos, another port a thousand miles up the river, and we may there take smaller steamers for the port of Iquitos, Peru, which is more than twenty-three hundred miles from the ocean.

XLVIII. PARA, THE METROPOLIS OF THE AMAZON

BEFORE we start on our tour up the Amazon we must explore the city of Pará. It lies in front of us back of the masts of those sailing vessels and steamers lining the shore. There is a row of tall palms between it and the river. They rise high above that line of bright-colored houses and their quivering branches are swaying in the wind from the sea. The land is so low that we can see but little of Pará from the steamer. The city runs far back from the water. It is about as large as Denver, and is the seaport of the Amazon valley.

Some of the ships among which we are moving have come from far up the river. There is a side-wheel steamer loaded with manioc and cacao from the Madeira (mä-dĕ′ē-rä). It has come more than a thousand miles to Pará. That ship beside it with the canvas over its deck under which people are

A street in Pará, the chief port of the Amazon valley. The city was once very unhealthy, but the yellow fever mosquitoes are now destroyed and it is much improved.

lying in hammocks is about to start up the Tocantins (tō-kän-tēnz′) River, and the vessel beyond is filled with rubber loaded almost in the foothills of the Andes and floated down from the wilds of Bolivia. The steamer over there with the English flag at its mast is leaving for Liverpool. It has Brazil wood, rubber, and nuts as a part of its cargo. The vessel beside it with the dense smoke pouring from its funnel is a Portuguese ship carrying cacao. It is starting for Lisbon. Farther over is a cargo steamer just in from New York; it has brought cotton goods, kerosene, hardware, pine lumber, and codfish to be sold in Pará, and will carry back boxes of rubber to be used in our factories.

What a busy stream is this through which we steam as we go to the docks. We pass hundreds of sailboats filled with vegetables and fruit, and countless dugouts being paddled swiftly along toward the shore. Now we are at the landing and the cargadores begin to load and unload our steamer. Other steamers are being unloaded by electric cranes, the goods being transferred directly from the ships to the railway cars. There are huge warehouses in the rear, and we begin to realize the vast trade of the port. All goods that go in and out of the Amazon valley must go through Pará. Several thousand ships call here every year and the trade amounts to tens of millions of dollars. We take automobiles and ride through Pará, going slowly through the residence and business sections and frequently stopping to ask about things of interest. In the oldest streets the buildings are close to the sidewalks. Their walls are of all colors and some of the houses are faced with porcelain tiles of blue, yellow, or green. The stores open on the street, and in front of some of them the goods are piled on the pavements.

There are numerous hammocks of all grades and prices,

some mere strips of canvas and others lace work of fine thread. Hammocks are the beds of the Amazon valley. They are cooler than mattresses. We may each buy one before we go up the river. Every Amazon boat has places in which hammocks can be swung, and when we go into the woods we can tie them to the branches of trees. Moreover, the hammocks are safer than ordinary beds, for bugs, ants, and snakes cannot hide in them.

Leaving the business section, we stop at the cathedral, which was erected in 1710, and go to the government palace, which was built about the time our Declaration of Independence was signed. We visit the city museum, situated in a grove of rubber trees, and are shown an experimental garden near by in which is every species of rubber plant known.

On our way back to the wharf we stop at a park by the river where fruit, vegetables, and merchandise are brought in small boats from the neighboring islands. Here the scene is a bright one. Scores of gayly dressed negro women are peddling all sorts of things and both women and men are trotting about with burdens on their heads. The buyers are of all classes. Many of them are purchasing fish, fruit, and vegetables for their household supplies. A crowd has gathered around a boat filled with baskets, which the people are buying and carrying off on their heads. The baskets are full of a coarse meal that looks like ground popcorn. We take a pinch out of one and find that it tastes much like sawdust. It is manioc flour, an article which forms the food of a great part of Brazil. Manioc is cheap and nutritious, and quantities of it are shipped to the United States. It is a root from which comes the tapioca we use in puddings and soups. The fruits remind us of Ecuador and show us that we are again in one of the lands of the equator.

We buy delicious pineapples for a few cents apiece, and the bananas and oranges almost melt in our mouths. We buy a green coconut and slice off the top, drinking the cool milk from the shell. There are quantities of black tobacco in long twists, some as big around as a baseball bat, and peddlers bring us parrots and monkeys and ask us to buy.

Vulture.

About the market are many vultures. They sit on the roofs of the court ready to swoop down and eat the scraps of meat thrown away by the butchers. Vultures are the scavengers of the Amazon. They are never killed by the people and hence are quite tame. Indeed, if they were not so disgusting we might easily catch them and pet them.

But what is that on the head of the man going out of the door of the market house? It is as big around as a washtub and about a foot thick. See, it is alive! It is poking its head in and out of its shell as he carries it off. That is one of the big turtles of the Amazon. They are found near Pará and in most parts of the Amazon basin. They have their breeding places where they go in countless numbers at certain times of the year. They dig holes in the sand and lay their eggs there. The eggs are about as big as hens'

Indian rubber gatherers of the Upper Amazon. A roof of palm leaves resting on a light framework of poles is sufficient protection from sun and rain. The foreman in front is a white Brazilian.

eggs; they have a leathery skin instead of a shell. Each turtle lays about one hundred and twenty, and millions upon millions of eggs are deposited in these laying places.

XLIX. IN THE LAND OF RUBBER

OUR travels during the next few days will be devoted to the rubber industry of the Amazon valley. Pará is one of the chief rubber ports of the world and in its warehouses we can see how rubber is packed for the markets. There are many rubber trees on the islands near the mouth of the Amazon. These islands can be reached by steam launch, and we arrange to visit a rubber plantation.

But first let us learn something about this wonderful product. Rubber was not known until after the discovery of America. We hear of it first at the time of the second voyage of Columbus, when he found the natives of some of the West Indies playing with rubber balls. It was Priestley, the chemist, who in 1770 first showed that rubber would erase pencil marks.

Rubber was first brought to the United States in the year 1800, and about fifty years later a Boston sea captain returned from Brazil with five hundred pairs of rubber boots made by the natives. They were sold for three dollars and upwards a pair, but it was not until many years later, after Charles Goodyear had discovered how to vulcanize rubber, that waterproof boots and shoes came into use.

To-day rubber is one of the most important of all the raw materials used by man. It keeps us dry in wet weather. It cushions the wheels on which we ride in bicycles, motorcycles, and automobiles; and most of our heavy hauling

in cities is done by trucks whose tires are of solid rubber. It is used in making airplanes, the wheels upon which they start and land being of rubber. We wade through the water in rubber boots, and race horses are shod with rubber shoes. Rubber in one form or another is employed in many kinds of machinery. It is found in some of the buttons with which we fasten our clothes and the suspenders and garters which hold up our trousers and stockings. During one year the public school children of New York City used more than ten thousand pounds of rubber ink erasers, and millions of elastic bands are annually consumed in our business cities. There are so many uses for rubber that great factories have grown up to make goods of this material, and we have one large city, Akron, Ohio, which makes more rubber goods than anything else.

For a long time almost all the rubber used by man came from the wild trees of the Amazon valley, although some rubber was gathered from the tropical forests of Africa and other parts of the world. About 1900 they began to plant rubber trees and cultivate them in Ceylon and on the Malay peninsula, and now by far the greater part of the rubber of commerce comes from there. In 1919 the United States imported almost five hundred million pounds of crude rubber, and about four fifths of that amount was produced on the rubber plantations of Ceylon and Malaysia. During that year we bought less than sixty million pounds from Brazil. Nevertheless, it is said that the very best of rubber is that from the forests of the Amazon basin.

Rubber is made from the latex or milky juice in the bark of the *siphonia elastica*, a wild tree found scattered through the forests of the Amazon basin. The rubber district is as large as the United States east of the Mississippi River. It includes parts of Brazil, Peru, and Bolivia, extending from

A rubber tree. The bark is scored to drain the sap. The native holds a string of dried latex.

the mouth of the Amazon westward to the foothills of the Andes, and on south to the headwaters of the Paraná River.

The rubber tree flourishes best in land that is flooded part of the year. Ground that is always above water will not do for it. The best conditions are found in the lands south of the Amazon and on the islands and lowlands not far from its mouth. Here a tree requires from fifteen to twenty years' growth before it will produce enough rubber to pay for tapping it. Most of the trees we shall see are older than that and some of them have been producing rubber for years. They bear a fruit consisting of a shell, inside which are three little nuts. When the fruit is ripe the shell bursts with a noise like a fire-cracker and throws the nuts to some distance. So many nuts come from each tree that it is said a man could easily gather enough in one day to plant a hundred acres of land. When planted these seeds grow rapidly. They must be shaded from the direct rays of the sun and must have plenty of moisture. After a time they can be transplanted, and if the soil and climatic conditions are right they will thrive without cultivation.

But we shall see these trees better by visiting one of the islands where they grow wild in the forest. We take a steam launch and ride all night on the Amazon. How bright the stars are and how the moon shines here in the soft air of the tropics! Our hammocks are slung from the roof of the boat, and as we lie in them the warm wind from the ocean fans us to sleep. We spend hours passing through one narrow channel after another and in the morning find ourselves at anchor before the house of a rubber planter. A little wharf extends from his front door to the river and we step out of the boat within a few yards of the house. It is a low, one-story building roofed with red tiles with a

wide veranda about it. At one end is a store-room filled with groceries and dry goods, which the planter sells to his rubber gatherers, and on the veranda itself are piles of what look like smoked hams but are really lumps of rubber ready for market. The planter gives us a breakfast of coffee and rolls, after which we walk with him through the dense forest, winding this way and that from one rubber tree to another.

How interesting it is and how different from what we imagined! We have heard of rubber groves and rubber forests. There is no such thing in nature. The trees are widely scattered. They are so far apart that each man has to walk several miles in gathering the saplike juice for one day. He has his own trees to attend, and they may range from sixty to one hundred and fifty in number, according to the distance between them. The trees assigned him are called a path or road. The size of a rubber plantation is estimated by the number of roads it contains. The roads are mere footpaths from one rubber tree to another.

We are winding our way along such a path now. Let us stop at one of the trees and look at it. It is not at all like the rubber plants we have in our hothouses. They have lean stems and thick leaves of polished green. This rubber tree has a trunk as big around as your waist. It is a great forest tree with leaves somewhat like those of the English ash.

How smooth the bark is! It is of a whitish gray, and at a distance of twelve feet above the ground it shines almost like silver. Farther down it is scarred, black, and warty, with streaks of yellow matter that looks much like beeswax here and there in the bark. Take out your knife and dig up a bit of the wax so that you can catch hold of it. Now pull at it. It will stretch from six to twelve inches from the tree before it comes off. This is coarse rubber, the

remains of the juice or latex that has dried on the tree. It will all be pulled out and saved, although it will be sold at a much lower price than the better varieties that we shall see made later on.

But here comes the rubber gatherer to tap the tree for the day. He has a little tomahawk, or hatchet, the blade

Collecting rubber. Mr. Carpenter at the left.

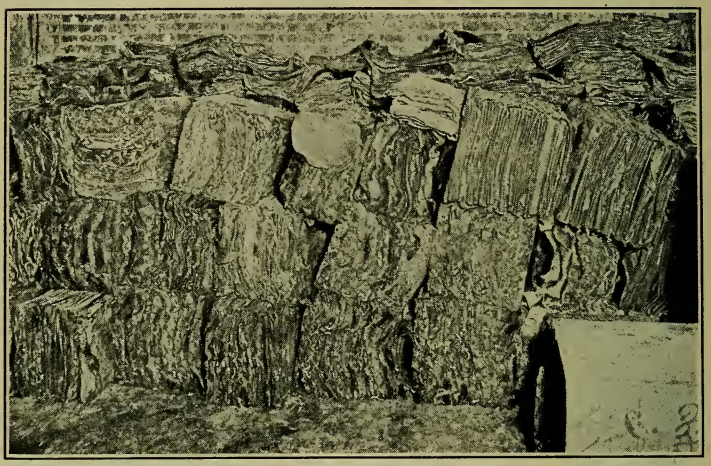
of which is just about an inch wide, and a lot of tin cups the size of egg cups. With the hatchet he makes a gash in the bark just deep enough to go through without cutting the wood. As he pulls back the hatchet a white fluid begins to ooze out. It is just like milk and makes us think of the juice of the milkweed. The fluid comes out in drops and the man takes one of the little tin cups and fastens it into the bark just under the wound so that the milk drops down into

the cup. He now makes two or three other gashes in the tree, fitting each gash with its cup, and then goes on to the next. He continues his work until every tree in his path has been tapped.

The fine rubber is cured by smoking.

The proprietor shows us how slowly the milk runs and says that only a few tablespoonfuls can be gathered from each wound in a day. It flows best in the morning and about noon the rubber man comes back to gather the milk in a gourd or bucket. The amount collected varies according to the richness of the trees, but if a man can get two quarts of milk in one day from his path he thinks he has done very well.

The next process is to turn the milk into the rubber of commerce. This is important. Upon exposure to the air the milk coagulates, or becomes hard, and if not properly treated turns to coarse rubber, which brings only low prices. The fine rubber is cured by smoking, the best coming from milk smoked only a few hours after it is gathered. Our



Sheets of plantation rubber ready for shipment. Such rubber comes only from Ceylon and Malaysia.

planter makes fine rubber and he sees that his men cure it as soon as they return from the forest.

There goes a man now with a bucket containing two quarts of the liquid rubber that he has just brought from the trees. Let us follow him and see the process of curing. We go with him to an open shed and watch him pour the milk into a bowl as large as those we use in mixing bread. See how white the juice is! It tastes sweet and is so thin that one could easily drink it.

Now the man stoops and builds a fire of palm nuts in one corner of the hut under a clay chimney raised a little from the floor. The chimney is so short that its top does not reach to our waists. See how the nuts burn and watch that dense smoke which pours out through the chimney.

But look! The man has taken a long paddle and thrust the end of it into the milk. It comes out as white as snow. The milk has stuck to the paddle. He now thrusts the end of the paddle into the smoke, twisting it rapidly as he does so, so that no drop of the precious juice may fall into the fire.

As the smoke touches it the rubber thickens and hardens, and its white is streaked with brown by the smoke. It has soon coated the paddle like varnish. The paddle is again thrust into the milk bowl, and when it comes out there is a fresh coat of rubber on it ready for smoking. This is hardened in the same way and the work goes on until a mass of rubber as large as a small ham is built up on the end of the paddle. Now the man takes a knife and makes a cut in one side. He pulls off the rubber and carries it to the house, where it is piled up with other lumps for shipment to factories all over the world.

L. A TRIP ON THE AMAZON RIVER

OUR next journey is to be up the Amazon. We shall travel for weeks upon the great river, but we might spend years and not see it all. We could go farther than the distance around the world in exploring its tributaries. Indeed, some of them are practically unknown. In 1914 Theodore Roosevelt came up the Paraguay River

At the wharves of Manaos, on the Rio Negro, 1000 miles up the Amazon. Ocean steamers ascend the river to this port. The town has a cable to Pará. We have a United States consul here.

to Matto Grosso and started down a small stream which grew larger and larger as he traveled upon it until at last, after a voyage of nine hundred and thirty miles, it took him into the Madeira River, through which he went on to the Amazon. This stream was named Rio Teodoro (tā-ō-dō′ro͝o) in President Roosevelt's honor.

Lying in our hammocks on the deck of the steamer, we enjoy the scenery as we move up the mighty Amazon, floating for miles in and out between walls of forest trees a hundred feet high. Now we are close to one bank and now near the dense vegetation of the opposite side. At times we go for hours in midstream where the Amazon is so wide that the forests make two faint lines of blue on our right and our left. Now we steam between islands so near the land that we can see into the huts of the rubber gatherers and others who have made their rude homes on the banks.

We are passing one on the right. It is not more than fifteen feet square. It is thatched with palm leaves and has holes in the walls for windows. There is a shed at one side, and inside this are two hammocks, in each of which a woman is lying. We see other huts farther on. Each has its boats tied to the shore. The owners rush to the banks and pull up the boats at the approach of our steamer. Sometimes they jump into them and row out from the land to prevent the waves made by the ship from overturning their boats or filling them with water. Most of the boats are dugouts, although at the larger houses there are rowboats, some of which are painted in bright colors. It is only by boat that the people can go from one place to another. There are no highways through these dense forests of the Amazon.

We have often heard of the tropical forest. We find it far different from what we supposed. It is not a great mass

of palms, although there are palms here and there in it. Most of it is made up of giant forest trees, some of which are not unlike the big trees of the temperate zone. As we steam on a mile or so from the shore it looks just like our forests at home. When we get closer, however, we see here and there the broad leaves of the palms and other tropical trees.

There are hundreds of feathery creepers, air-plants, which hang like strands of green silk from the branches. There is a dead limb clothed with orchids. Farther over is a great round mass of blue flowers rising out of the green. That is a tree in blossom, and if you look to the right you may see huge bunches of white, yellow, and purple, the flowers of other forest trees that grow only along the Amazon. There are trees here as tall as the tallest trees of our forests, each of whose tops forms a bouquet of violet blue as big as a haystack. Surrounded by green, they rise a hundred feet above us. There are stacks of flowers as yellow as buttercups high in the air, and we now and then see trees loaded with flowers much like tiger lilies, only they have a tinge of red mixed with their yellow and black, making them more beautiful.

Close to the shore in many places the trees rise like a wall from the water. Many of them are a hundred feet high, and the creepers and vines that crawl up their trunks and wind this way and that in a tangled mass are so thick that it is almost impossible to cut one's way through. Most of the trees have a whitish-gray bark, and some of the trunks are so twisted and ribbed that they look like cables of white taffy braided together to support the vast mass of foliage above them.

One of the noblest trees of all rises far above the others. This is the tree which produces the Brazil nut. It grows

to a height of one hundred and fifty feet, with magnificent foliage of dark green leaves. Its fruit is the shape of our black walnut, save that it is bigger around than the biggest baseball. It has an outer skin like a walnut and a similar hard shell within. Inside the hard shell are the long, three-cornered Brazil nuts that are sold in the stores. There are often twenty nuts in one shell. The nuts are gathered and carried in boats to Pará, where the shells are broken and the Brazil nuts of commerce are taken out. The nuts are quite heavy, and we tremble as we walk under the trees for fear some may drop on our heads. We hear monkeys chattering in the branches and fear they may throw the nuts at us from the tops of the trees.

At the town of Obidos (ō-bē′dōs), five hundred miles from the Atlantic, the channel of the Amazon narrows and the immense volume of water pours through an opening about a mile wide. The current here is so strong that our steamer dares not rely on its anchor alone, but has also a cable by which it is tied to a tree on the bank. We wait for some hours and during our stay are taken in canoes to the shore. The town is a collection of rude houses built along three or four narrow streets. Obidos has a factory for making chocolate, and we learn that there are many cacao plantations near by. We see more cacao trees as we sail on our way up the river. The orchards line the south bank of the Amazon for miles.

Some distance above Obidos we pass the mouth of the Madeira, and soon after come to a place where the waters of the Rio Negro (nā′grō) join those of the Amazon. The Rio Negro is as black as ink and the Amazon as yellow as mud. The Rio Negro keeps its color for a long distance after it reaches the Amazon before it is swallowed up by that great yellow monster. We ride along in our steamer on the

line where the two colors join, seeing the black on one side of the ship and the yellow on the other, but soon turn to the right and sail for an hour up the wide Rio Negro, to the city of Manaos, the rubber metropolis of the central Amazon valley.

Manaos lies on the river bank high above the water. Its wide streets are lined with palm trees and its bright houses shine under the tropical sun. It is a large city for this part of the world, having about half as many people as Pará. It is at the junction of many navigable waterways; therefore it is the best place for the trade of this region and must continue to grow. We are surprised to fine good houses and modern improvements here in the heart of the wilds. Manaos has electric street-cars, electric lights, and good schools. It has one of the finest theaters of Brazil, a market, a museum, and some large stores. To it come steamers from all parts of the Amazon valley. The largest ocean steamers from the United States and Europe can come from the ocean right up to Manaos. The Rio Negro at this point is two miles in width and more than one hundred feet deep at low water.

The port has good landing arrangements, notwithstanding that there is a difference of forty or fifty feet in the height of the river between the wet and the dry seasons. From December to May the largest ocean steamers can come to the quay, but when the river is low a mud bank three hundred feet wide extends out from it. For this reason a lower quay has been built. This is under water at the flood season. There are also floating docks which are used during that season.

The rubber gatherers bring quantities of rubber to Manaos from the vast regions west and south of it, and they come by the hundreds for their supplies, often trading rubber

for goods. It is from here that expeditions start out to explore the wilds of the Amazon and its tributaries, and we can find boats and men here who will go with us to almost any part of this little known region.

LI. SOME WILD INDIANS OF BRAZIL

THERE are many wild Indians scattered here and there throughout the Amazon basin, and also some more or less civilized, who are engaged by the white men in the gathering of rubber. We often think of our continent as the chief home of the red race, and of the United States as the country where most of the Indians lived before the white men came. The truth is, South America had more Indians than North America, and it is estimated that there are now four or five times as many Indians in Brazil as in the United States. In Matto Grosso are the Tupi-Guaranis (to͞o′pē gwä-rä′nēs), much like the redskins we saw in Paraguay. They are a mild people, good-looking and intelligent. The Jesuit Fathers have christianized many of them and books have been printed in their language. Indeed, Tupi-Guarani is now understood in most parts of central South America.

In the wilder parts of São Paulo and in other parts of southern and western Brazil live the Botocudos (bō-tō̇-ko͞o′dōz), who are as degraded as the Indians we saw about the Strait of Magellan. They have huts in the woods, and they feed largely on nuts and roots and what they can kill. Most of them are of less than medium height. Their hair is black, and their skins are yellowish-brown, rather than red.

Many of the Botocudos still wear great plugs of wood, bone, or stone in their lips and ear lobes. Some of these plugs are as big around as a pint cup and others as large as a napkin ring. Think of making a hole in your lip or ear lobe so large that a glass tumbler could be carried in it! We have photographs of these Indians showing that this is actually done, and we learn that such decorations are

The Botocudos wear plugs in their lips and ear lobes. These plugs are as large around as a napkin ring.

thought to be beautiful. When a girl is eight years old a small hole is made in her lower lip with the hard point of a stick, and a little plug is put in to keep the hole open. As the sore heals a larger plug is inserted, and as time goes on larger and larger plugs are used, the flesh growing and stretching around them until the lip becomes a mere strip of skin. The holes in the ears are made in the same way. This custom is now dying out, but it is still kept up in some of the tribes of the wilds. In northern Brazil are found

the Caribs and the Arawaks, whose forefathers emigrated to the West Indies and were found there by the Spaniards. They were brave, and they fought against the white invaders of their territory. The Caribs were said to have been canni-

Amazon Indians equipped with blow guns through which they shoot poisoned arrows.

bals. The Arawaks are not so strong as the Caribs, but they are much more civilized. They weave cloth of various kinds and make some things of gold.

Other tribes along the Amazon River have blow guns, through which they shoot arrows tipped with poison. The

blow guns are pipes about an inch in diameter and ten to twelve feet in length. They are made of a hard wood which is split and then hollowed out. After the parts are glued together and wrapped with rattan they are perfectly air-tight. The arrows are as thick as a hatpin and about a foot long. They are as sharp as a needle, the blunt end being wrapped with cotton so that it fits the hole in the blow gun. The arrow, having been dipped in poison, is blown out of the pipe with such force that it flies to a distance of from fifty to one hundred feet. The poison is so venomous that a scratch will cause death.

Along the river Tapajos, the mouth of which we passed on our way up to Manaos, live the Mundurucos (mo͞on-do͞o-ro͞o′ko͞oz), who cut off the heads of their enemies and preserve them as trophies. They cure them in such a way that all the features are preserved as in life. They do not squeeze the heads in and make them smaller as do the Indians at some of the headwaters of the Amazon in Ecuador. There are many of these heads thus preserved shown in the museums of Brazil. They have eyes of black gum surrounded by bone to represent the whites, and the mouths are closed with black rubber.

During our stay at Manaos we are told that the government of Brazil has many plans to civilize its Indians. It has placed some of the tribes on reservations and has given lands to the members of other tribes. It is starting schools and experimental farms in many of the states and doing what it can to pacify the wild tribes and make them civilized people.

We spend several days at Manaos talking with the explorers and others from many parts of the Amazon basin and planning our tour for the future. We find that we could take a good steamer and sail on the Amazon more

These men are head hunters of the upper Amazon.

than thirteen hundred miles farther west to Iquitos in Peru and there find trails by which we could walk over the Andes to the west coast. Or we could steam up the Madeira River and by the Madeira-Mamoré (mä-mō-rā′) railway go around the great falls and thence on up into the Beni River,

Home on the banks of the Rio Negro. The house is thatched with grass. Shredded palm leaves are sometimes used.

by which we could reach trails to La Paz and Lake Titicaca. The Madeira-Mamoré railway is about two hundred miles long. It was built by men from the United States to take passengers and freight around the falls, and it enables the rubber of Matto Grosso and Bolivia to be brought down the Amazon to Manaos and Pará.

We decide, however, to make our way northward into Venezuela, and we continue our journey up the Rio Negro. We ride for days through its black, muddy waters, winding in and out through dense forest until at last we come to the mouth of the Casiquiare (kä-sē-kyä′rā), a river uniting the Orinoco with the Amazon system. We travel northward some distance on this stream and are soon floating down the Orinoco through the llanos (lä′nōz) on our way to the Atlantic.

1. Why is the Amazon called the King of Rivers? Compare its basin with the United States. Compare the rainfall with that of your home. How long is the Amazon? The Orinoco? The Rio de la Plata? The Mississippi-Missouri? The Nile? (See Table VII.)

2. Locate the three principal Amazon ports on the map. How far inland is Manaos? Iquitos?

3. Describe your trip through Pará. Name some of the exports and imports which you see on the ships and in the stores.

4. How many things can you mention for which rubber is used? What do you own that is made of it? What is plantation rubber? Where is it grown? Name a United States city which is noted for its rubber factories. Describe a visit to a rubber forest. Tell how the rubber is gathered and prepared for the market. (See Carpenter's "How the World is Clothed," chapter 34.) Follow a shipment of rubber from Pará to Akron.

5. Locate on the map the chief tributaries of the Amazon. Trace President Roosevelt's journey up the Paraguay and on to the Amazon. About where is the stream that is named for him?

6. Give a picture of the tropical forest. What nut do we get from there? Bring some from the store to class.

7. Describe Manaos. Why has it become so important?

8. Which country has the most Indians, Brazil or the United States? Name some of the tribes of Brazil. Which are the most civilized? The most savage?

9. By what two routes might we go from Manaos to the Pacific Ocean? Locate the Madeira-Mamoré railway. What river connects the Amazon system with the Orinoco? Take a trip from New York to Pará, direct and by the Panama Canal.

The Orinoco is the third largest river on the South American continent. The land is low and tropical.

LII. THE ORINOCO AND THE LLANOS

IS this not a wonderful system of rivers by which almost all the continent east of the Andes is watered? We have seen how close the headwaters of the Paraguay are to the southern sources of the Amazon. Indeed, with a short canal, we might start from the Caribbean Sea into the mouth of the Orinoco, go on water almost all the way through interior South America, and come out again into the Atlantic Ocean through the Rio de la Plata. If you will look at your map of South America you will see how easily we might trace our way from the Orinoco into the Cassiquiari and then go over the route we have just traveled back to Manaos and down the Amazon to the mouth of the Tapajos River. We might sail up the Tapajos to its source, when we would be so near the beginnings of the Paraná system that in a day we could walk to one of them and float with the current into the Paraguay River, up which we came to visit Matto Grosso, Brazil.

But we are now on the Orinoco. Its thick yellow waters, loaded with sediment, are rushing in a swift current down to the Atlantic. They have been gathered from mountains far to the westward and poured in through countless branches from the llanos, or vast meadows, and other parts of the basin, which all together forms a territory one fifth as large as the whole United States. The Orinoco is, indeed, a wonderful river. It is the third largest on the South American continent, being surpassed only by the Amazon and the Rio de la Plata. It is almost fifteen hundred miles long, and its main stream is navigable for twelve hundred miles, although the rapids of Maipures (mī-pōō-rās′) and Altures (äl-tōō-rās′) are about eight hundred and forty miles from its mouth. The river is navigable hundreds

Indians of the Orinoco. These Indians have become civilized far enough to adopt white men's dress in place of the more comfortable fashions of their neighbors shown on page 361.

of miles above the falls, and below them it flows with a gentle current over almost level country to the sea, the tides being felt two hundred and fifty miles from the ocean.

The Orinoco has four hundred navigable branches, and it furnishes so many water routes that there are few places in its basin not accessible to one of them by a mule ride of a few days.

Now we have left our small boats and are again on a steamer. We are traveling through a country far different from that of the Amazon. The dense forest has disappeared and a vast expanse of level land stretches away on both sides of the river. The plains are called llanos. They are covered with coarse grass, the most of which is now luxuriantly green. Here and there it is gray, and we sometimes pass a tract that has been blackened by fire.

See that smoke away off to the right and the flames rolling up from the ground. That is one of the prairie fires of central Venezuela. It has been started by the farmers, who are burning off the dead grass that a new crop may quickly come up.

How many cattle there are on the llanos! We see herds of thousands, and we learn that stock raising is one of the great industries of this country. More and more cattle are being reared every year and Venezuela now has several million beeves feeding upon its great plains. The beasts are grown for their meat and skins. The skins are salted and dried and shipped by the thousands to the United States and Europe, where they are tanned and made into leather for shoes and other products.

The meat is stripped from the bones in sheets and salted and made into the jerked or dried beef so much desired by the people of Spanish and Portuguese America. It is taken

on the steamers down the Orinoco and has a ready sale also in the various islands of the West Indies.

But what is that town away off on the right bank of the river? There are blue and white buildings with red roofs rising in terraces upon the low hills. There are steamers at anchor at the wharf. It seems quite a city. That is the first evidence of civilization we have seen since we left Manaos some weeks ago. We are approaching the metropolis of the llanos, the chief city of interior Venezuela. Its name is Ciudad Bolívar (syōō-thäth′ bō-lē′vär), and it forms the center of trade for a vast region. From it go the chief exports of cattle, and it is also the point from where expeditions start for the gold mines farther south.

Now we have landed and are walking up the steep, narrow streets paved with rough cobbles. The houses are almost all of one story. They are built about courts like those of the Spanish towns we saw in our tour along the west coast. There is plenty of grass in the streets. There are no wheeled vehicles to speak of and we shall have to use horses in making our trips. Every well-to-do family on the llanos has plenty of horses, and we shall have no trouble in getting good saddle animals. Most of them are single-footers, having a gait like a pace, which carries one along so gently that he feels as though he might be riding on the rocking-horse of his baby brother.

There are but few carts in Venezuela. Things are carried about upon donkeys. Here comes one now with two huge baskets filled with vegetables slung to his sides. Behind him is another carrying boxes of bread, and we see others loaded with all sorts of things, including wood, bricks, and stone, which they are patiently bearing to different parts of the city. We see more donkeys from the country when we visit the market. They have neither bridles nor halters

and they stand blinking their eyes as they wait for their masters to drive them back home.

There are many kinds of vegetables and tropical fruits sold in the market. We see quantities of plantains and bananas and learn that they form a large part of the food of the people. There is plenty of beef, also manioc flour such as we saw on the Amazon.

There are red clay bowls for cooking and many of the grass hammocks that form the beds and loafing and sitting places of nine tenths of the people. We frequently sleep in hammocks during our visits to the large farmers near Ciudad Bolívar.

There are steamers every few days from Ciudad Bolívar down the Orinoco. They sail out through the delta and go on to the island of Trinidad, where one can get ships for La Guaira (lä gwī′rä) and other coast cities of Venezuela.

The steamer on which we go out to the sea is a great side-wheeler with two decks, much like the boats on the Hudson. It has a North American captain, but with the exception of ourselves the passengers are all Venezuelans. Some of them are white, others are of the mixed race of Spaniards and Indians, while others seem to have negro blood in their veins. There are also a few native Indians among the deck passengers. There are many women and children on board and each seems to have a pet of one kind or another. Indeed, there are so many cats, dogs, monkeys, parrots, and other birds that the scene on the deck makes us think of a zoölogical garden.

We steam on for a day before we come to the delta. The river is wide and there are numerous islands. There are few villages and not many people. The water is so thick that it seems to drop mud as it flows. It is in this way that

the river has built up the great delta through which we go to the Caribbean Sea.

The delta of the Orinoco is about as large as the state of New Jersey. It is for the most part a tropical jungle cut by channels of various widths, which are lined with mangoes, palms, and other wild forest trees bound together with long creepers much like those we saw on the Amazon.

Here and there Indian huts and clearings have been made in the jungle. The huts are mere sheds of poles and palm leaves, and the people within lie in their hammocks or come outside and gaze at us as the steamer goes by. The men and boys have only a rag about the waist and the little children are naked. The women wear short petticoats of the fibrous bark of the palm tree. All seem lazy and we learn that they hunt and fish only enough to keep them alive.

LIII. VENEZUELA AND ITS CAPITAL

WE stay only a few hours at Trinidad and then take ship for the ports of Venezuela. We travel from one place to another, making excursions into the country, visiting all the large cities, and spending some weeks in Caracas, the capital.

Venezuela is one of the most fertile of the South American republics. It is so large that it would make about ten states the size of Indiana, and there are few others so well watered. We have seen something of the Orinoco basin. The country has many other navigable rivers, including more than one thousand streams.

The coast line of Venezuela is longer than the Mississippi River without the Missouri; it has thirty-two harbors and

numerous bays, the largest of which is Lake Maracaibo (mä-rä-kī′bō), about the size of our Great Salt Lake.

It was from Lake Maracaibo that Venezuela was named. When the Spaniards discovered the country, about eight years after Columbus first came to America, they entered this bay. On its shores and islands they found a tribe of natives living in huts made of palm leaves and rushes. The huts were built upon piles driven into the sand. They were surrounded on all sides by water and the people went from one place to another in canoes. This reminded the Spaniards of Venice and they called the country Venezuela, which means "Little Venice," and by this name it is known to this day. Even now Lake Maracaibo has buildings on piles. The Indians inhabiting them live by fishing. They are quite savage, and although they speak Spanish they have not united with the whites as have many other tribes of the country.

We have seen something of the lowlands of Venezuela and their vast pastures, which it is said could support thirty or more times as many cattle as the country now has. The chief of these are in the basin of the Orinoco. North and west of that basin are hills and mountains, and here and there little ranges of hills. Caracas is situated a

short distance back from the seacoast in a nest in the mountains.

This part of Venezuela is one of great possibilities. It has mineral deposits, including gold and copper. Petro-

A water carrier is one of the sights of a Venezuelan town.

leum has been found and there are deposits of asphalt in the lake of Bermudez and on the shores of Lake Maracaibo. The island of Trinidad has a pitch lake from which comes

the asphalt with which many of the cities of the United States are paved. This lake is a mile and one half in diameter. Trinidad is a colony of Great Britain.

The chief wealth of Venezuela lies in its soil. It has large territories fitted for growing coffee, cacao, and cotton, and it produces rubber, vanilla, sugar cane, and corn. The most valuable product is coffee. The climate here is warmer than in the coffee lands of southern Brazil, and the trees are raised differently. They have to be shaded from the sun, and many of the plantations are irrigated. The shading of the coffee trees is done with banana plants. These shoot up quickly and their wide green leaves cover the tender coffee sprouts, at the same time keeping the soil moist. Other rapidly growing trees are planted later. These send out branches somewhat like those of the sycamore and furnish just the right shade. The coffee is much like mocha and is often sold as such in our markets.

The cacao of Venezuela is also especially fine. Some of our best chocolate candies and cakes are made from the beans exported from this country to New York and Boston, from which they are shipped to the chocolate factories. The trees are carefully cultivated. They are set out in orchards, which are irrigated and shaded much as the coffee is. The trees produce abundantly, sometimes two crops in one year.

LIV. LA GUAIRA AND CARACAS

WE have landed at La Guaira, the chief port of Venezuela, among steamers from Dutch, English, Spanish, Italian, and other European ports. There is a vessel at the pier that has just come from New York.

Caracas, the capital of Venezuela. The city lies in a beautiful valley, but far enough above the sea to be cool and healthful.

The town is hot, and the tropical sun beats down upon us; and the temptation is great to take ship and be home within a week or ten days. However, we have still several South American countries to see, so we turn our backs on the steamer and stroll through the town, hugging the shady side of the streets.

La Guaira is the principal gateway of Venezuela to the outside world. Most of the exports go out from here, and it is connected by railway with the capital, Caracas, situated a half mile higher above the sea and in a straight line only six miles back from the coast. However, we have no flying machines, and we shall go there by the long, winding way up the mountains by rail. All together, we shall have to travel on the cars about twenty-two miles.

The ride is one of the most delightful of all the railroad rides of this wonderful continent. As we start out from La Guaira we pass through banana plantations and groves of palms and then shoot into a jungle of tropical vegetation. The road soon rises. Now we are climbing the mountains, turning this way and that. Now we go over bridges, looking down into cañons many hundred feet deep, and now shoot through tunnels, to come out again, on the side of the mountain, with a vast expanse of the blue Caribbean Sea under our eyes. The air is cooler and we drink in great breaths. The fever-laden, tropical atmosphere of the coast has vanished. As we rise we are more and more invigorated, and when we leave the train at the Caracas station we are in one of the most healthful climates of the world.

The city lies in a beautiful valley about two miles wide and fifteen miles long, surrounded by mountains, some of which are two miles high. The valley is covered with sugar plantations, vegetable gardens, groves of coffee and cacao, and orchards of oranges, lemons, and other fruits.

Venezuelan girls are taught to sew and embroider.

We have already looked at our histories and know that Caracas is one of the old towns of the New World. It was founded forty years before Captain John Smith began to build the first hut at Jamestown. It was taken from the Spaniards by the English, and later by the French, but it continued to be a Spanish town until there was a revolt in South America against Spain, in which Venezuela and Caracas were the first to declare their independence and throw off the Spanish yoke. Nevertheless, the city seems almost new as we go through it to-day. Its sidewalks are paved with cement and its bright buildings are of all the colors of the rainbow. The houses are mostly of one story, so built from the danger of earthquakes. They have roofs of red tiles, and their windows facing the streets are heavily barred. We can see the women and girls looking out.

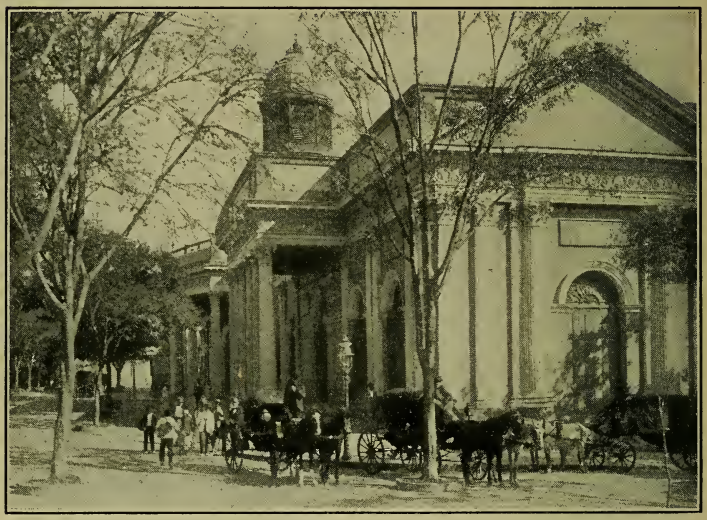
The streets cross one another at right angles, with the Plaza de Bolívar in the center. This plaza is surrounded by the government buildings, also the university, the cathedral, and the Episcopal palace.

What interests us more than all these, however, is the equestrian statue of Simon Bolívar in the center of the plaza. Simon Bolívar was the George Washington of South America. He organized the movement that resulted in the independence of this country, and which gradually spread to the other colonies in South America. He fought also for New Granada, or Colombia, and Peru, and was the founder of the republic of Bolivia. We heard of him while in La Paz.

We call upon the president at the federal palace and spend some time in the houses of Congress, learning that the republic of Venezuela has a constitution much like our own. It has thirteen states and five territories, and the

president has a cabinet and government departments much like those of the United States.

The Venezuelans are hospitable and they make us at home. They have schools in the cities where the boys learn manual training and the girls are taught to sew and embroider. Many of them speak English and French and



Federal palace at Caracas. Here the laws of Venezuela are made.

we find that the better classes live quite as comfortably as we do. These one-story houses cover a great deal of ground. The rooms encircle patios in which grow rose trees, many different kinds of palms, and all sorts of tropical plants. We have frequent motor-car rides through the valley in which Caracas is situated, and we learn much of tropical agriculture. The people are greatly interested in the United States, for a large part of their trade is with us.

1. Trace on the map a journey from Trinidad to Buenos Aires by inland waterways. Through what countries do you go? On what rivers?

2. Compare the Orinoco with the Amazon and the Rio de la Plata. What are the llanos?

3. Bound Venezuela. Compare it with your state in size. How did the country get its name?

4. What are the chief products? What kind of candy do we make from one of them?

5. Locate the chief port of Venezuela. Its capital city.

6. Describe your trip through Caracas. What great South American statesman was born there? Write a story of his life.

LV. THE GUIANAS

WE have one more territory to visit before we can close our tour of the South American continent. This is the land of the Guianas, three little countries situated at the northeastern end of South America and bounded by Venezuela and Brazil. They are a mass of highlands separated from the rest of the continent by the basins of the Amazon and the Orinoco.

The Guianas are different from the other countries of South America in that they are colonies and not independent republics. Each belongs to a nation of Europe and is governed by the mother country. British Guiana is a dependency of great Britain, Dutch Guiana belongs to Holland, and French Guiana to France. Each of these colonies has a governor appointed by the ruler of the nation to which it belongs. None has a large population and none is of much importance in the commerce and trade of our great sister continent.

Still, when South America was discovered, this region was

High Street, Georgetown, Guiana. Most of the houses are of wood. The streets have electric lamps.

thought to be the richest of all. It was described by the early explorers as filled with gold, silver, and precious stones. One adventurer who skirted the Guianas and entered the Orinoco told of a city called El Dorado, which rose out of a great white lake, whose smallest house was grander than any palace of the Incas or Aztecs. "In this city," said the explorer, "the vessels of the kitchens are of gold and silver studded with diamonds. The houses have statues of solid gold as big as giants, and there are figures of beasts, birds, fish, and trees, all of gold. The pleasure gardens of the island are filled with figures of gold and silver, and the king of the country and his court wear clothes of such a nature that they seem to be sprinkled with gold and silver from sandal to crown."

These stories excited all Europe, and expeditions started out to find the city and explore this part of the world. Great numbers of young men joined the expeditions, expecting to make fortunes, and in looking for the fabulous city they explored the greater part of northern South America, penetrating to the sources of the Orinoco and the rivers that flow into the Atlantic through the Guianas. It was from an expedition sent by Sir Walter Raleigh that Great Britain became possessed of British Guiana, and it

The water buffalo, one of the beasts of burden of British Guiana, is well adapted to tropical climates.

is said that he presented to Queen Elizabeth some nuggets and images of solid gold to show the value of his discovery. Gold really exists along the Orinoco, the Essequibo (ĕs-ā-kē′-bō), and in some of the streams of British, French, and Dutch Guiana. The deposits are comparatively small, and El Dorado, with its gold and diamond kitchen utensils, is yet to be found. However, diamonds are mined in British Guiana, and more than ninety thousand of these precious stones have been found in one year.

The exact extent of the territory is undecided. French Guiana claims a part of Brazil, and British Guiana has for a long time contended that much of Venezuela should rightly belong to it. At the lowest estimate, however, each of the three countries is as large as the state of New York, and each contains some excellent land. The climate of most parts is unhealthful. It is exceedingly hot and the highlands are covered with forests as dense as the wildest parts of the Amazon. Here and there are high grassy plains, upon which cattle might be fed, and upon the lowlands near the coast sugar, coffee, and cotton can be grown. Much of the country is still unexplored.

What kind of people are there in these countries? We shall see the civilized population of the coast cities. The majority of the inhabitants, however, live in the wilds. They are savage Indians and savage negroes, the descendants of runaway slaves. The Indians are of many tribes and they have strange customs. The Arawaks, according to report, have a game called the whip dance, in which the dancers stand in two rows opposite each other. Each has a whip with a hard, strong lash made of fiber. With these they whip the naked calves of each other's legs until the blood runs down their heels. The dance is looked upon as a test of endurance and bravery, and the man who can

stand the most whipping is considered the best. The game is said to go on with perfect good temper and at its close the dancers drink one another's health.

The people of another tribe wear nothing but a strip of cloth around their waists. They are fond of jewelry and pierce their lower lips in such a way that two pins can be worn in them. They have also pins in their nostrils and deck their necks and arms with such beads and coins as they can pick up. Most of these reports come from hearsay, and like the story of the golden city of El Dorado they may not be true. We have not the time to make such explorations ourselves and so shall leave the exact nature of the Indians in doubt, saying we suppose they may be as reported, but we really do not know.

There is no doubt about there being many black people in the Guianas, and we shall see civilized negroes everywhere. Slaves were imported for generations to work the sugar plantations and get the fine woods out of the forests for export to Europe. After slavery was abolished many of the negroes settled on the coast lands where they had been toiling. Their thatched huts are to be seen everywhere. They are now farmers.

Other negroes went off to the woods and formed tribes of bush negroes, intermarrying with the Indians. The bush negroes have a language that is a mixture of Dutch, French, and English combined with Indian and African words. Some of the wild negroes are brave; many are strong and fine-looking.

But here we are at the wharf of Georgetown, the capital of British Guiana. We have sailed up a little river, the banks of which are lined with tropical vegetation, with estates devoted to sugar and rice cut out of the jungle.

There are many coconut palms, clumps of bamboos, and great trees covered with flowers.

What a queer crowd is that on the wharf! We rub our eyes and wonder if we are not in Asia rather than in South America. There are scores of almond-eyed Chinese, many black Hindoos in turbans and strange garments, and Parsees wearing long black coats and hats like inverted coal scuttles. There are numerous Portuguese and English merchants who have come to the steamer. Most of the Hindoos and Chinese have been imported to work on the plantations of sugar and rice, and we shall find them scattered everywhere through the coast countries.

How queer Georgetown seems after our long stay in other parts of the continent. It is more like a city of Holland than of Spain or Great Britain, to which this country belongs. The roofs are slanting and the houses are of wood or galvanized iron. Many of them are tall, with gable ends facing the street.

Georgetown is a small city, but it has some large buildings. It lies on low land, and these buildings stand upon wooden piles driven into the mud to form the foundations. In some of the streets are canals, which serve to drain the water into the river in times of flood.

The city has many modern improvements, including electric lights, electric street-cars, and telephones, and its water comes from artesian wells. We stroll along the Ring, a beautiful walk on the banks of the river, shaded with fine cabbage palms. We enjoy visiting the stores, for the merchants speak English; they ask us to visit them in the suburbs, where they have houses in beautiful gardens filled with tropical plants.

The sugar plantations are interesting. Many of them are large, employing hundreds of laborers and making mil-

lions of pounds of sugar a year. Each plantation has its manager and overseers, and its books are kept as carefully as those of our great business establishments.

Along the coast of the Guianas the climate is so hot and wet and the land is so rich that the sugar cane can be cut several times a year, and it will grow up for many years in succession without being replanted. The soil is composed of earth washings brought down from the mountains and it will raise anything produced in the tropics. The rainfall here is over ninety inches a year, and if the water stayed where it fell, it would reach higher than our heads. The floods are so great that dikes have been erected to keep the land from being overflowed. These dikes are expensive, and therefore nearly all the plantations are owned by men and companies having large capital.

The Guianas are a land of many rivers. In British Guiana is one of the high waterfalls of the world. It is the Kaietur (kä-ē-to͞or′) Falls on the Potaro, a branch of the Essequibo River. This fall is about four hundred feet wide and has a drop of eight hundred feet or five times as great as the American fall at Niagara.

We find more plantations near Paramaribo (pä-rä-mär′ĭ-bō), the capital of Dutch Guiana, which we reach in a little Dutch ship from Georgetown. Paramaribo lies about twenty miles up the Surinam River, its harbor being defended by the two forts of Zeelandia and New Amsterdam. It has about fifty thousand inhabitants, and in architecture, waterways, and houses it is not unlike the smaller cities of Holland.

Many of the people speak Dutch, a language that sounds queer when it comes from the negroes we see everywhere. There are many whites and mulattoes. There are also brown-skinned men from the Dutch island of faraway Java,

Cayenne has a grove of Royal palm trees behind it. There are more than one hundred and fifty varieties of palms in South America.

who have come to work in the sugar plantations. The better classes are dressed in light clothes, the women wearing stiff skirts, loose jackets, and head-dresses not unlike turbans. The poor people go barefooted, and some of the children wear no clothing whatever.

Village near Cayenne.

Dutch Guiana is rich, producing rice, sugar, cacao, and coffee. One of the chief exports is balata, the gum of the bully-tree, which is used for insulating electric wires. We get thousands of pounds of this gum from the Guianas, and many people are kept busy there gathering it for us.

From Paramaribo we steam on to Cayenne (kā-ĕn′), the capital of French Guiana, situated in the mouth of the Cayenne River on an island about ten miles in diameter.

The city is much smaller than either Georgetown or Paramaribo, but it looks quite large from the ship. It has a grove of palm trees behind it and a high church steeple rising over the rest of the buildings. Most of the houses are of two stories, some of them being covered with plaster painted in all the colors of the rainbow.

This land is not much different from that of the other Guianas, and the people are about the same. They have, however, many hard faces among them. The country for years has been a penal colony, to which thieves and other criminals have been exported from France.

The climate is not healthful and, indeed, no traveler would care to stay long. We are glad when the steamer arrives on which we can go back to the island of Trinidad, where, having finished our long tour of the South American continent, we take ship for New York.

1. Where are the Guianas? To what three nations do they belong? How do they differ in government from other South American countries? Describe the three countries. What kind of people do they have?

2. Name the capital of each country. Where is it situated? Describe it.

3. What are the chief products of the Guianas? What gum do we get from Dutch Guiana? For what is it used? How does Guiana keep the water from spreading over the lowlands? What European country does this?

4. Where are the Kaietur Falls? Compare them with Niagara; with Iguassu.

5. Tell the story of El Dorado.

6. From where do we sail for New York? How far is it? What large islands do we pass on the way?

TABLE I. SAVING OF DISTANCE MADE BY PANAMA CANAL. DISTANCES FROM ATLANTIC TO PACIFIC PORTS BY OLD ROUTE VIA STRAIT OF MAGELLAN AND BY PANAMA CANAL

(In Nautical Miles)

	To Port Townsend (Seattle) via San Francisco	To San Francisco	To Guayaquil	To Callao	To Yokohama via San Francisco	To Shanghai via San Francisco and Yokohama	To Manila via San Francisco and Yokohama	To Sydney via Tahiti	To Valparaiso
New York									
old route . .	14,019	13,244	10,423	9,702	17,780	18,910	19,530	14,560	8,461
via the Canal	6,074	5,299	2,864	3,359	9,835	10,885	11,585	9,852	4,630
New Orleans									
old route . .	14,419	13,644	10,823	10,102	18,180	19,310	19,930	14,960	8,861
via the Canal	5,447	4,698	2,263	2,759	9,234	10,284	10,984	9,251	4,029
Liverpool									
old route . .	14,619	13,844	11,023	10,302	18,380	19,510	20,130	15,160	9,061
via the Canal	8,813	8,038	5,603	6,098	12,574	13,624	14,324	12,591	7,369
Hamburg									
old route . .	15,019	14,244	11,423	10,702	18,780	19,910	20,530	15,560	9,461
via the Canal	9,242	8,467	6,032	6,527	13,003	14,053	14,753	13,020	7,798
Antwerp									
old route . .	14,754	13,979	11,158	10,437	18,515	19,645	20,265	15,295	9,196
via the Canal	8,963	8,188	5,753	6,248	12,724	13,774	14,474	12,741	7,519
Bordeaux									
old route . .	14,474	13,691	10,868	10,157	18,235	19,365	19,985	15,015	8,916
via the Canal	8,713	7,938	5,503	5,998	12,474	13,524	14,224	12,491	7,269

TABLE II. DISTANCES FROM UNITED STATES AND EUROPE TO PRINCIPAL SOUTH AMERICAN PORTS

From	To New York	To New Orleans	To San Francisco	To Port Townsend (Seattle)	To Liverpool
Buenos Aires	5,868	6,318			6,243
via Strait of Magellan			7,511	8,286	
via New York . . .			9,059	9,067	
Callao					
via Panama . . .	3,392	2,764			5,937
via Strait of Magellan	9,603	10,142			9,980
direct			4,012	4,769	

TABLE II (*Continued*)

FROM	TO NEW YORK	TO NEW ORLEANS	TO SAN FRANCISCO	TO PORT TOWNSEND (SEATTLE)	TO LIVERPOOL
Panama [1]			3,277	4,052	
via Canal and Colon	2,028	1,427			4,591
Pernambuco, Brazil	3,696	3,969			4,078
via New York			[2] 6,887	[2] 6,895	
via New Orleans			[2] 6,451	[2] 6,948	
via Panama			6,530	7,305	
via Strait of Magellan			9,439	10,214	
Punta Arenas (Strait of Magellan)	6,890	7,340	6,199	6,958	7,314
Rio de Janeiro	4,778	5,218			5,158
via New York			[3] 7,969	[3] 7,977	
via New Orleans			7,700	8,197	
via Panama			7,678	8,453	
via Strait of Magellan			8,339	9,114	
Valparaiso			5,140	5,902	
via San Francisco	8,331	7,662			
via Panama	4,637	4,035			7,207
via Strait of Magellan	8,460	8,733			8,747

[1] Distance by canal from Colon to Panama, 17 miles.

[2] By land and water.

[3] Distances given are by water except as otherwise stated.

To estimate time of travel, allow 30 miles an hour by railway and 15 miles an hour by steamship.

TABLE III. AREAS OF CONTINENTS AND OCEANS

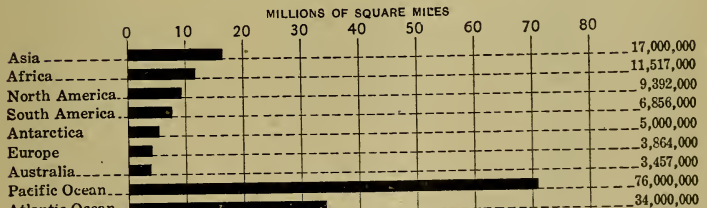


Table IV. Heights of Mountains

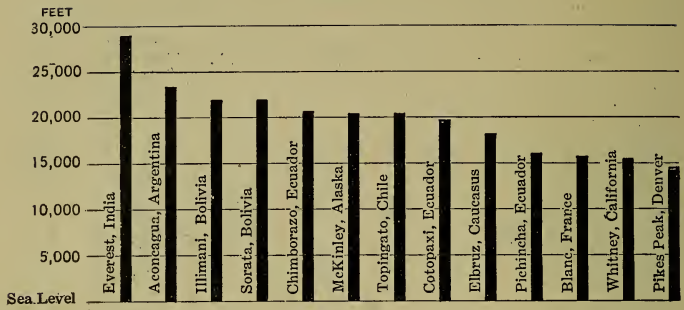


Table V. South American Countries

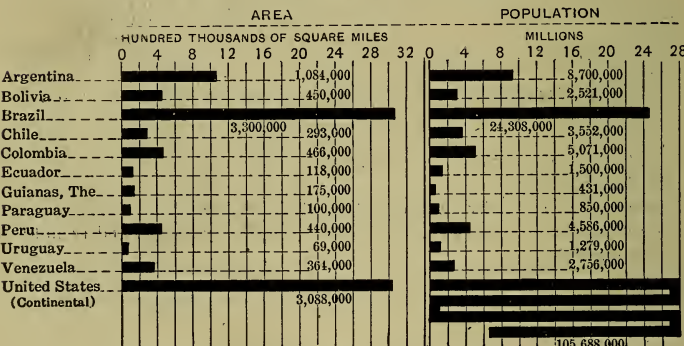


Table VI. Population of South American Cities

Argentina	
Buenos Aires	1,637,000
Cordoba	156,000
Rosario	222,000
Bolivia	
La Paz	100,000
Sucre	30,000
Brazil	
Bahia	290,000
Manaos	50,000
Pará	200,000
Pernambuco	150,000
Rio de Janeiro	1,128,000
Santos	35,000
São Paulo	450,000

TABLE VI (*continued*)

Chile	
Antofagasta	66,000
Concepcion	73,000
Iquique	47,000
Santiago	415,000
Valparaiso	212,000
Colombia	
Barranquilla	64,000
Bogotá	137,000
Cartagena	37,000
Medellin	65,000
Ecuador	
Guayaquil	94,000
Quito	70,000
Guianas, The	
Georgetown	54,000
Paramaribo	37,000
Cayenne	13,000
Paraguay	
Asuncion	101,000
Peru	
Arequipa	40,000
Callao	34,000
Cuzco	15,000
Lima	143,000
Uruguay	
Montevideo	361,000
Venezuela	
Caracas	87,000

TABLE VII. SOME SOUTH AMERICAN RIVERS

	MILES		MILES
Amazon	3,400	Paraguay	1,300
Bio Bio	250	Paraná	2,790
Colorado	700	Parnahyba	1,070
Essequibo	600	Pilcomayo	1,200
Grande	850	Plata-Paraná	2,500
Guayas	200	São Francisco	1,810
Iguassú	825	Tapajos	1,245
Madeira	2,025	Teodoro	800
Magdalena	1,000	Tocantins	1,650
Negro	970	Uruguay	1,030
Orinoco	1,500		

Some Other Great Rivers

Kongo	2,800
Mississippi-Missouri	4,200
Nile	3,900

Table VIII. Number of Cattle

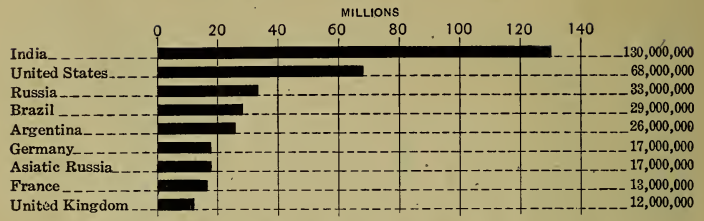


Table IX. Number of Sheep

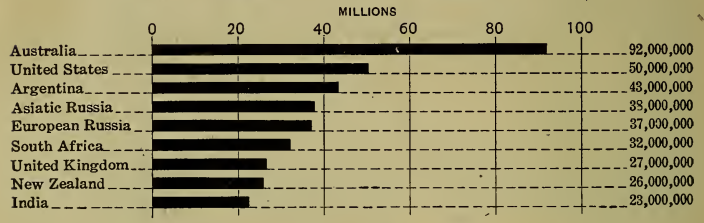


Table X. Principal Wheat-Producing Countries

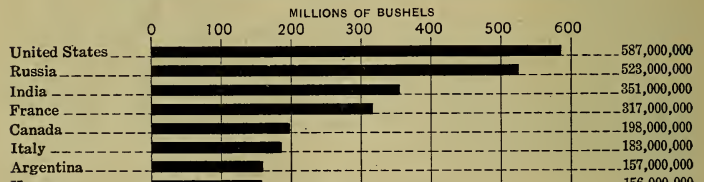


Table XI. Principal Copper-Producing Countries

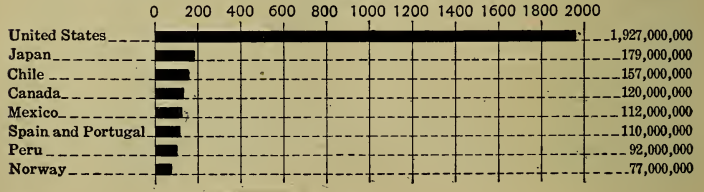


Table XII. Principal Silver-Producing Countries

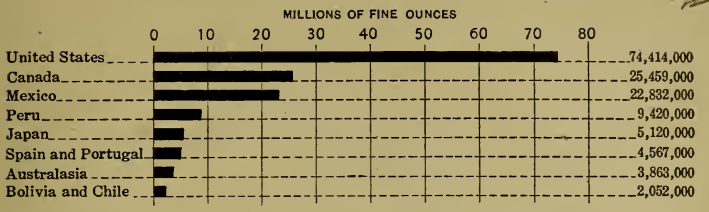


Table XIII. Principal Tin-Producing Countries

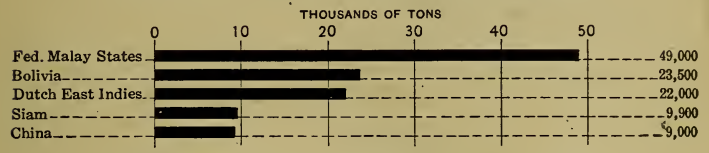


Table XIV. Principal Coffee-Producing Countries

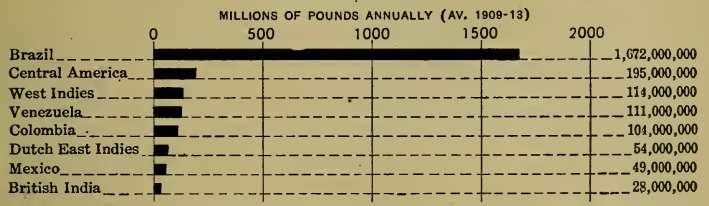


Table XV. Principal Rubber-Producing Countries

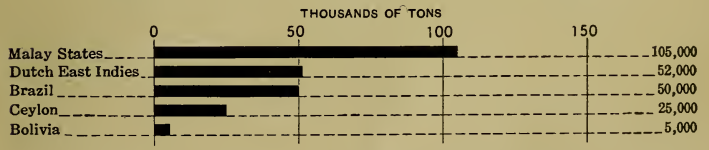
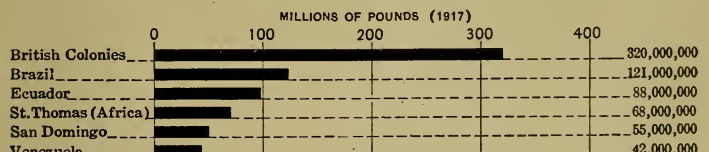


Table XVI. Principal Cacao-Producing Countries



INDEX

Aconcagua, Mount, 17, 98, 158, 215
Alpacas, 105
Amazon River, 17, 333–363
Amazon, Valley of the, 333–363
Andes Mountains, 17, 31, 66–76
Antofagasta, 135, 144
Argentina, 196–231, 241–247
Armadillos, 228
Ascotan, Lake, 136
Asuncion, 257–263
Atahualpa, 74, 84

Bahia, 318–324
Bahia Blanca, 198
Balboa, port of, 38
Balboa, Vasco Nuñez de, 27
Bananas, 43, 45, 62, 290, 373
Barranquilla, 46
Bodegas, 61
Bogota, 48–50
Bolivar, Simon, 117, 376
Bolivia, 117–134
Borax, 136–137
Brazil, 275–363; rivers of, 177, 322; water powers of, 277, 322
Buenos Aires, 223–231

Cabot, Sebastian, 243
Cacao, 19, 43, 62, 64, 276, 355, 373
Callao, 86
Cape Horn, 179
Caracas, 371–378
Cattle, 43, 208–210, 240, 264, 366, 371
Cauca River, 44
Ceara, 330–332
Cerro de Pasco, 99
Cayenne, 388
Chile, 135–196
Chimborazo, Mount, 68
Chocolate (*See cacao*)
Cinchona, 126
Ciudad Bolivar, 368
Coal, 54, 175–179, 190
Coca, 129
Coffee, 19, 43, 64, 276, 289, 293–301, 308, 373
Colombia, 40–55
Colon, 26
Concepcion, 176
Copper, 54, 64, 99, 145, 190, 372
Cordoba, 215–217
Corrientes, 247
Cotopaxi, Mount, 68
Cotton, 43, 81, 92, 94, 293, 322, 328–331
Cristobal, 26
Cuyaba, 282–284
Cuzco, 104–110

Desert, South American, 77–85, 135–145
Diamonds, 325–327, 382

Ecuador, 56–76
El Dorado, 380, 382
Emeralds, 51–55

Flax, 222
Forests, 173, 247–253, 278

Galapagos Islands, 56
Gauchos, 211
Georgetown, 384–385
Germans, 174, 224, 288
Gold, 27, 64, 131, 190, 284, 325, 372, 382
Gran Chaco, 247–353
Grapes, 165, 215
Guanaco, 199
Guano Islands, 142–144
Guayaquil, 34, 57–60

Guayas River, 56
Guiana, 379–389; British, 384; Dutch, 386; French, 388
Gulf Stream, 24

Honda, 48

Iguassu Falls, 284–286
Iguassu River, 284–286
Illimani, Mount, 112
Indians — Alacalufes, 185; Araucanians, 136, 175; Arawaks, 359, 383; Aymaras, 107, 119; Bolivia, 122, 126; Botocudos, 357; Brazil, 357–360; Caribs, 359; Colombia, 49; Ecuador, 72–75, Guaranis, 257; head hunters, 75; Incas, 104–109; Lenguas, 250; Mundurucos, 360; Onas, 194–195; Paraguay, 250; Peru, 83–85; Quichua, 107; Tobas, 250; Yaghans, 195.
Iodine, 142
Iquique, 139
Iquitos, 280, 337, 362
Iron, 145, 276, 325
Italians, 224, 301, 312
Ivory nuts, 62

Kaietur Falls, 386

Lace, 268
La Guaira, 373–374
La Paz, 120–124
Lima, 85–92
Llamas, 102
Locusts, 217

Madeira River, 355
Magdalena River, 45–49
Magellan, Ferdinand, 28, 187
Magellan, Strait of, 181–196
Manaos, 356
Manganese, 325
Manioc, 263, 340
Maracaibo, Lake, 371
Maté, 271–275
Matto Grosso, 280–288
Meat, 210, 228, 238
Meiggs, Mount, 96
Mendoza, 215
Montevideo, 234–240

Negroes, 19, 320–321, 384
Nitrate, 135–142

Oranges, 43, 81, 257, 263, 268–271, 322
Orinoco River, 364–370
Oruro, 132–133

Pacific Ocean, 27, 40–41
Pampas, 203–213
Panama, 27–39
Panama Canal, 28–39
Panama hats, 64
Pan American Union, 14
Para, 337–342
Paraguay, 254–275
Paraguay River, 254, 280
Parahyba, 330
Paramaribo, 386
Paraná River, 241–247
Passports, 13
Patagonia, 197–203
Paulo Affonso Falls, 324
Peccaries, 253
Pernambuco, 328
Peru, 76–117
Petroleum, 54, 101, 372
Pichincha, Mount, 70
Pizarro, 74, 84, 89, 104, 106
Platinum, 54
Porto Alegre, 286
Portuguese, 278
Potatoes, 91, 101, 124; chuno, 110
Punta Arenas, 188–189

Quinine, 126
Quinua, 101
Quito, 61, 66–75

Railways — Andes, 92–98; Bolivia, 118; Brazil, 288, 290, 324; Madeira-Mamore, 362; Peru, 113; Transandine, 150–159
Rhea, 200
Rimac River, 86
Rio de Janeiro, 278, 305–318
Rio de la Plata River, 241–247
Rio Negro River, 355, 363
Rio Teodoro River, 352

Roosevelt, Theodore, 352
Rosario, 220, 244
Rubber, 19, 64, 124, 276, 342–351

San Salvador, 25
Santiago, 159–165
Santos, 289–290
São Francisco River, 324
São Paulo, 290
Sheep, 43, 189, 192–194, 198, 203–206, 264
Silver, 64, 99, 131, 145
Snakes, City of, 301–303
Sorata, Mount, 112
Soroche, 96–98
Sugar, 43, 81–82, 214, 257, 328–331, 385

Tequendama Falls, 50
Tierra del Fuego, 189–195
Tin, 99, 131, 133
Titicaca, Lake, 110–117
Tobacco, 262, 276, 293, 322
Trinidad, 369, 372
Tucuman, 214
Turtles, 56, 341

Uruguay, 232–240

Valparaiso, 146–150
Vanadium, 99
Venezuela, 370–379
Vespucius, Americus, 15, 306
Vicuna, 104
Vultures, 341

Wheat, 165, 217–222
Wool, 227. *See sheep.*

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